SCIENCE

THE MAIN BOOK

2023

FIRST TERM

BY A GROUP OF SUPERVISORS

Interactive E-learning Application

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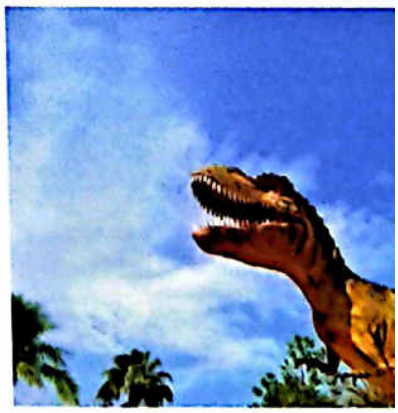
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Glossary

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UNIT 1

Periodicity of Elements and their Properties



Lesson 1	Attempts of Elements Classification.
Lesson 2	Graduation of Elements Properties in the Modern Periodic Table.
Lesson 3	Main Groups in the Modern Periodic Table.
Lesson 4	Water.

Unit Objectives :

By the end of this unit, students will be able to :

- Follow the efforts and attempts of some scientists to classify elements (Mendeleev - Moseley - Modern Periodic Table).
- Recognize the principles of elements classification in the modern periodic table.
- Estimate scientists' efforts in discovering, classifying and investing elements.
- Determine the location and properties of some elements in the modern periodic table by recognizing their atomic numbers.
- Compare between the properties of groups and periods in the modern periodic table.
- Compare between metals, nonmetals and inert gases from their electronic configuration and chemical activity.
- Describe main groups in the modern periodic table.
- Describe elements properties and their uses.
- Use tools, materials and instruments in studying elements properties.
- Determine the chemical and natural properties of water.
- Explain the irregularity of the natural properties of water.
- Describe the chemical bonds among the atoms and molecules of water (covalent and hydrogen).
- Recognize the polarization of some chemical compounds (Water - Ammonia).
- Recognize the electrolysis of water.
- Explain the equivalence of water.
- Describe how water reacts with some of the elements of chemical activity series.
- Determine water pollutants and their bad effects.
- Determine the methods and measures of protecting water from pollution.
- Determine his/her personal responsibilities to protect water from pollution.
- Take needed decisions to protect water from pollution.

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LESSON 1

Attempts of Elements Classification



What are the most important attempts to classify elements ?

Many attempts are made by scientists for classification of elements according to their properties G.R. In order to :

- Facilitate their study.
- Find a relationship between elements and their chemical and physical properties.



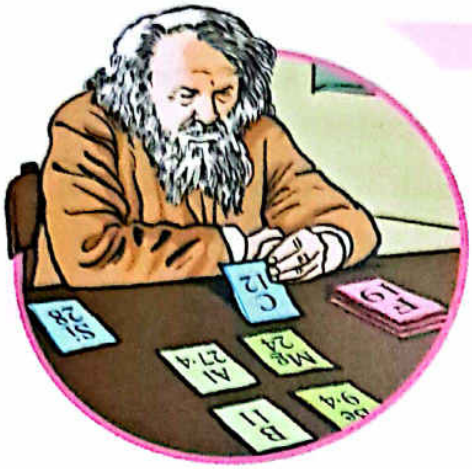
The most important attempts are

1. **Mendeleev's periodic table.**
2. **Moseley's periodic table.**
3. **Modern periodic table**

1 Mendeleev's periodic table



- It is the first real periodic table for classifying elements.
- At this time, only **67 elements** were known.
- The Russian scientist **Mendeleev** explained his periodic table in his book **"Principles of Chemistry"** in 1871



How did Mendeleev classify elements ?

1 He prepared **67 cards**, each card represented an element.

2 **He recorded on each card :**
- The symbol of one element.
- Atomic weight of this element.
- Important properties of this element (boiling point, melting point, density, formula of oxide, ...).

3 He arranged elements of similar properties in **vertical columns** which were known later as **groups**.

4 **He classified the elements of each main group into two subgroups (A) , (B)** G.R.
Due to the differences between their properties.

5 **He discovered that :**
- The elements are arranged in an ascending order according to their atomic weights on moving from the left side of the table to the right side in **horizontal rows** which were known later as **periods**.
- The properties of elements were **repeated periodically** by the beginning of each **new period**.

Advantages of Mendeleev's table

1. He predicted the discovery of new elements and determined the values of their atomic weights, therefore he left gaps (empty cells) in his table.
2. He corrected the atomic weights of some elements, which were estimated wrongly.

Enrichment information

In 1871, Mendeleev predicted the properties of an unknown element and named it (ICA silicon) . This element was discovered later in 1886 and was named Germanium (Ge) and its properties were the same as Mendeleev had predicted.

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Disadvantages of Mendeleev's table

1. **He had to make a disturbance in the ascending order of atomic weights of some elements** G.R. To put them in groups that suit their properties.
2. **He had to deal with the isotopes of one element which were later discovered as different elements** G.R. Due to the difference in their atomic weights.

G.R. | ***Mendeleev had to put more than one element in one cell as iron, cobalt and nickel.*** Due to the similarity in their properties.

Enrichment information

- *Isotopes : Many forms of atoms of one element having the same atomic number but differ in atomic weight such as: the isotopes of hydrogen* ${}^{1}_{1}H$, ${}^{2}_{1}H$, ${}^{3}_{1}H$

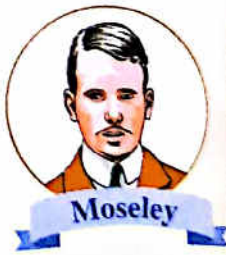
2 Moseley's periodic table

In 1913

- The Newzealand scientist **Rutherford** discovered that the nucleus of the atom contains positively charged protons.



- In the same year, the British scientist **Moseley** :
  - Named the term of "atomic number" of an element on the number of positive protons in the nucleus of its atom.
  - Discovered after studying X-rays properties, that the periodicity of elements properties is related to their atomic numbers and not to their atomic weights as Mendeleev believed.



Enrichment information

Among the discoveries which have helped Moseley to put his periodic table are :

1. Radiation activity phenomena. *2. Getting of X-rays.*

3. More knowledge about the arrangement of electrons in atoms.

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The most important modifications of Moseley on Mendeleev's table

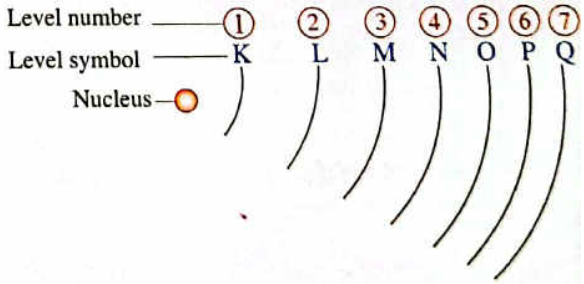
1. He arranged elements in an **ascending** order according to their **atomic numbers**, where the atomic number of each element increases by **one** from the preceding element in the same period.
2. He added to the table :
   - The **zero group** which includes inert (noble) gases.
   - The **other elements** that were discovered after the preparation of Mendeleev for his periodic table.
3. He specified a place below the table for lanthanides and actinides elements.

3 Modern periodic table

- **The recent studies led to the identification of the accurate composition of the atom, where :**
  - The Danish scientist **Bohr** discovered the **main energy levels** of the atom (as shown in the following figure) and their number reaches 7 in the heaviest known atoms till now.



  - **Scientists** discovered that each main energy level consists of a definite number of other levels known as ***energy sublevels***.



Main energy levels

- **Accordingly**
  - The elements were reclassified in a new table known as the ***"Modern periodic table"*** in which the elements are classified in an **ascending** order according to :
    - Their atomic numbers.
    - The way of filling their energy sublevels with electrons.

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Enrichment information

Each main energy level consists of a number of energy sublevels equals to its number.

Main level	First K	Second L	Third M	Fourth N
Sublevels	s	s, p	s,p,d	s,p,d,f

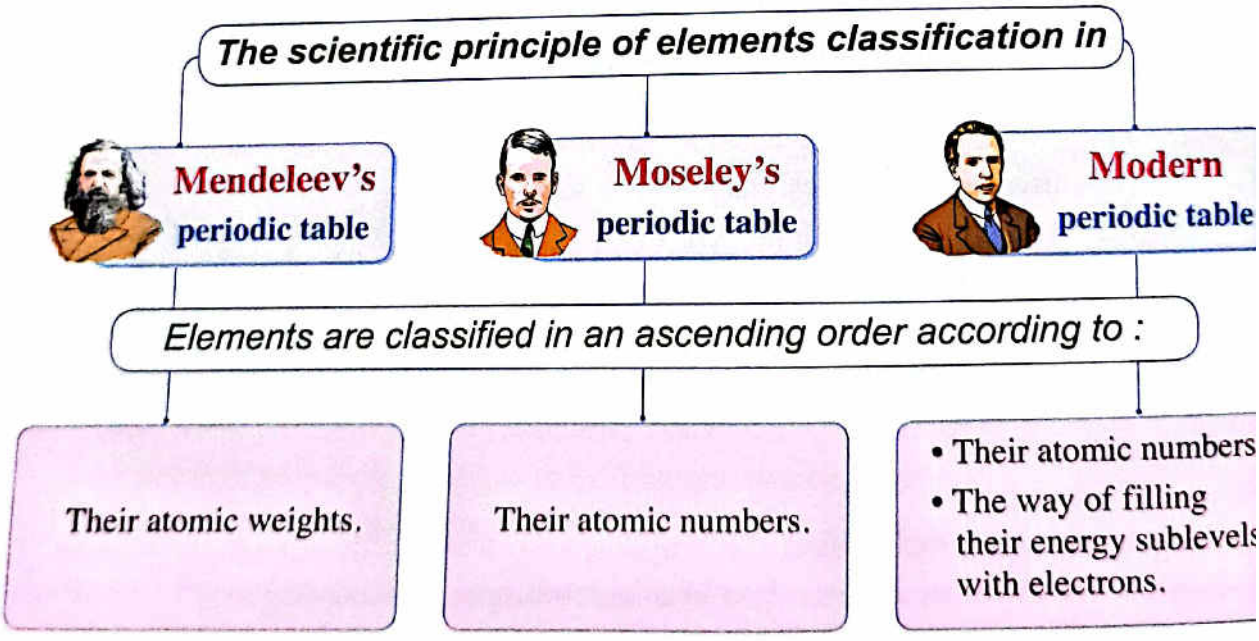
Note

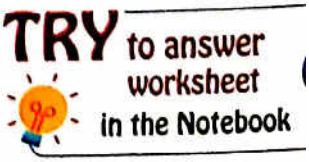
The number of known elements in the modern periodic table till now is 118 elements, 92 elements are abundant (available) in Earth's crust, while the rest are prepared artificially under special conditions.

Enrichment information

The recently discovered elements do not exist in nature, but they are prepared artificially from other elements. They are radioactive elements, whose nuclei disintegrate in less than a second.

*** We can summarize the scientific principle of elements classification in the following diagram :**





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Blocks of Modern Periodic Table

Description of the modern periodic table

* **The modern periodic table (shown in the previous page) consists of :**
  - 7 horizontal periods, where each period starts by filling a new energy level.
  - 18 vertical groups, where each group has a traditional number and a modern number.

* **The modern periodic table is classified into 4 main blocks :**

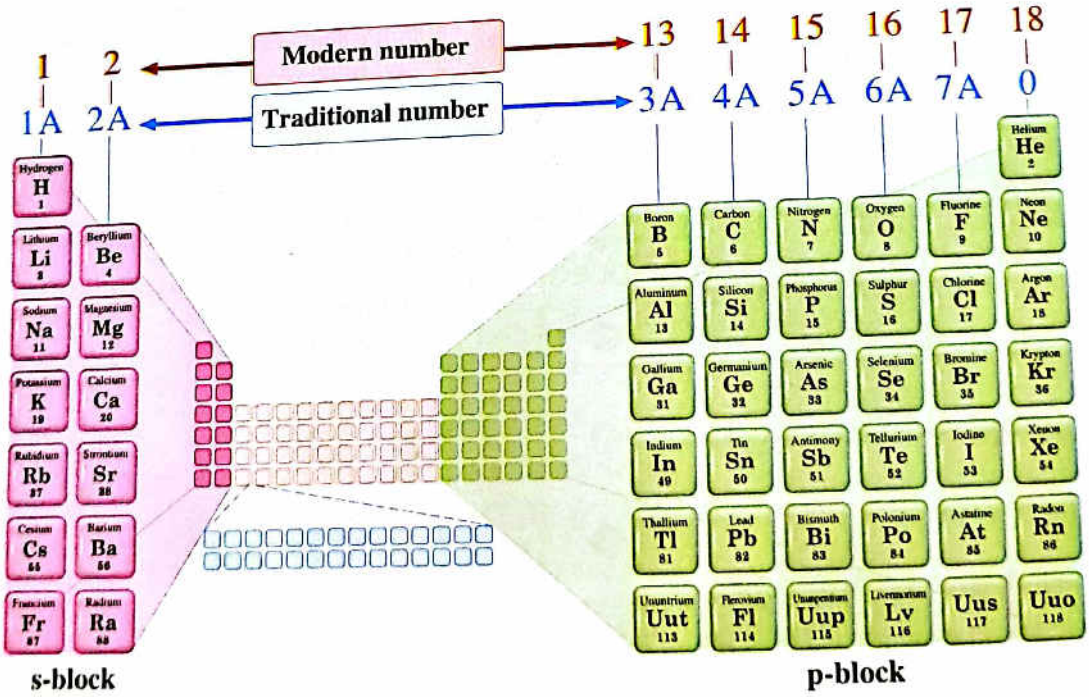
1 s-block , **2** p-block , **3** d-block , **4** f-block ,

1 s-block

- It is located on the **left side** of the periodic table.
- It consists of **two** groups.
- The two groups of s-block take letter "**A**".
- It includes the two groups (**1A**) and (**2A**).

2 p-block

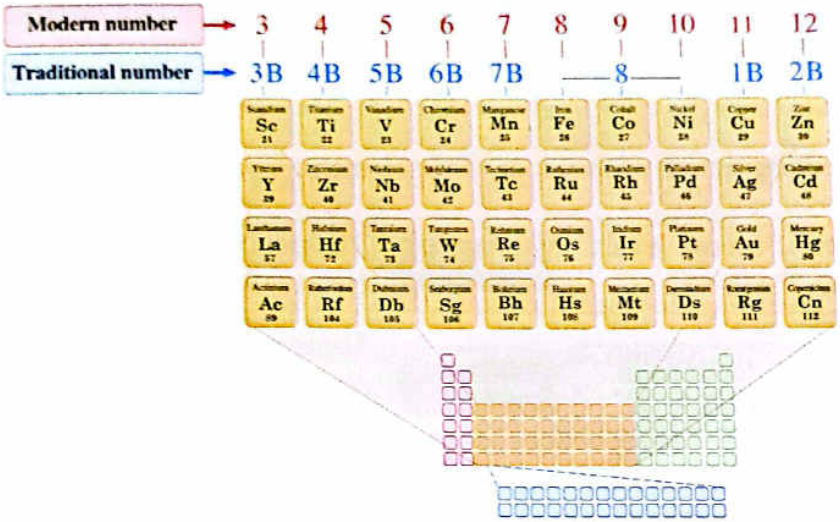
- It is located on the **right side** of the periodic table.
- It consists of **six** groups.
- All groups of p-block take letter "**A**" except zero group (18) "Noble gases".
- It starts with group **3A** (**13**) and ends with zero group (**18**).



The position of s-block and p-block groups in the modern periodic table

3 d-block

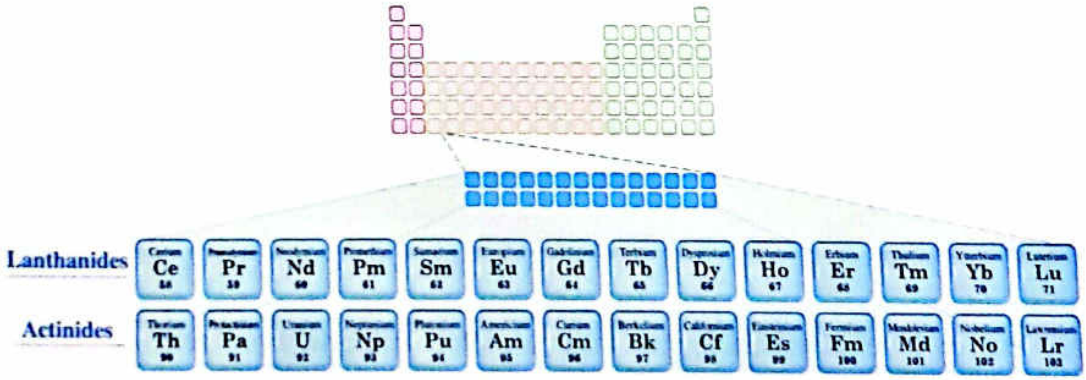
- It is located in the **middle** of the periodic table.
- It separates between **s-block** elements (left side of the table) and **p-block** elements (right side of the table).
- It consists of **ten** groups.
- All groups of d-block take letter "**B**" except group **(8)** which contains 3 vertical columns.
- It starts to appear from **period (4)**.
- It starts with group **3B (3)** and ends with group **2B (12)**.
- The elements of d-block are known as **transition elements**.



The position of d-block groups in the modern periodic table

4 f-block

- It is located **below** the periodic table.
- It consists of two horizontal series which are **lanthanides** and **actinides**.



The position of two series of f-block in the modern periodic table

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Remember

*** You have known from the previous studies that :**

- The atomic number = Number of electrons = Number of protons.
- The number of electrons which saturate the first four energy levels (K, L, M and N) can be calculated from the relation ($2n^2$), where (n) is the number of energy level therefore :

(1) K level is saturated with 2 electrons. **(2)** L level is saturated with 8 electrons.

(3) M level is saturated with 18 electrons. **(4)** N level is saturated with 32 electrons.

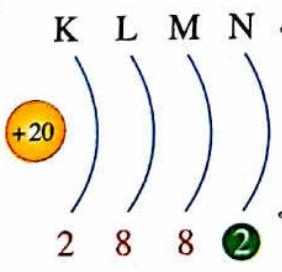
How to determine the location of elements of groups (A) in the periodic table by knowing their atomic numbers :

Write The electronic configuration of the atom of the element.

And from this determine

1. The number of energy levels occupied by electrons **indicates** The period number of the element.
2. The number of electrons in the outermost energy level **indicates** The group number of the element (according to the traditional number).

Application : Determine the location of $_{20}Ca$ in the modern periodic table.



Electronic configuration of $_{20}Ca$ atom

Number of energy levels occupied with electrons = **4 energy levels** → So → The element is located in **period (4)**.

Number of electrons in outermost energy level = **2 electrons.** → So → The element is located in **group (2A)**.

Note

The outermost energy level of all noble gases is completely filled with 8 electrons except helium with 2 electrons, because it contains only one energy level (K level).

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* **The following table shows examples on determination of the location of some elements of groups (A) in the modern periodic table :**

Element	Electronic configuration	Number of energy levels occupied by electrons	Period number	Number of electrons in the outermost energy level	Group number		Block
					Traditional	Modern	
$_8O$	K L +8)) 2 6	2	2	6	6A	16	p-block
$_{10}Ne$	K L +10)) 2 8	2	2	8	zero	18	p-block
$_{12}Mg$	K L M +12))) 2 8 2	3	3	2	2A	2	s-block
$_2He$	K +2) 2	1	1	2	zero	18	p-block

G.R. ***Helium ($_2He$) is located in zero group, and isn't located in group (2A).***
Because it has only one energy level (K) which is saturated with 2 electrons, so it is a noble gas that is located in zero group (group 18).

Question

Complete the following table :

Element	Electronic configuration	Number of energy levels occupied by electrons	Period number	Number of electrons in the outermost energy level	Group number		Block
					Traditional	Modern	
$_{15}P$	K L M +15)))	.....	.....	.....	.....	.....	.....
$_{18}Ar$	K L M +18)))	.....	.....	.....	.....	.....	.....
$_{19}K$	K L M N +19))))	.....	.....	.....	1A	1	.....
$_1H$	K +1) ...	.....	1	.....	.....	.....	.....

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* **From the previous explanation, we conclude that :**

Elements of the same group	Elements of the same period
Number of energy levels	
• They are different in the number of energy levels occupied by electrons.	• They are similar in the number of energy levels occupied by electrons.
Chemical properties	
• **They are similar in their chemical properties.** **G.R.** Because they are similar in the number of electrons in the outermost energy level.	• **They are different in their chemical properties.** **G.R.** Because they are different in the number of electrons in the outermost energy level.
G.R. ***Magnesium ($_{12}Mg$) and calcium ($_{20}Ca$) are similar in their properties.*** Because they are located in the same group (2A) , so they are similar in the number of electrons in the outermost energy level (2 electrons).	**G.R.** ***Aluminium ($_{13}Al$) and chlorine ($_{17}Cl$) are located in the same period in the periodic table.*** Because they are similar in the number of energy levels occupied by electrons (3 energy levels).

How to determine the atomic number of elements of groups (A) by knowing their location in the periodic table :

Determine

1. The number of energy levels occupied by electrons **by knowing** The period number of the element.
2. The number of electrons in the outermost energy level **by knowing** The group number of the element (according to the traditional number).

Write The electronic configuration of the atom of the element taking into consideratio that the inner energy levels are completed with electrons.

Calculate The sum of numbers of electrons that revolve in energy levels **represents** The atomic number of the element.

i.e. The number of electrons that revolve in energy levels
= The number of protons inside the nucleus of the atom
= The atomic number of the element.

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Exercise

Calculate the atomic number of each of the following elements :

1. Element (X) is located in the second period and in group (7A).
2. Element (Y) is located in the third period and in zero group.

Answer

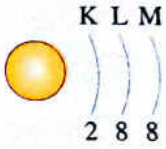
1. ∵ **Element (X) is located in :**
   - Period (2). ∴ Its electrons are distributed in two energy levels.
   - Group (7A). ∴ The outermost energy level contains 7 electrons.

   ∴ The atomic number of element (X) = 2 + 7 = 9



2. ∵ **Element (Y) is located in :**
   - Period (3). ∴ Its electrons are distributed in three energy levels.
   - Zero group. ∴ The outermost energy level contains 8 electrons.

   ∴ The atomic number of element (Y) = 2 + 8 + 8 = 18



Notes

In the modern periodic table

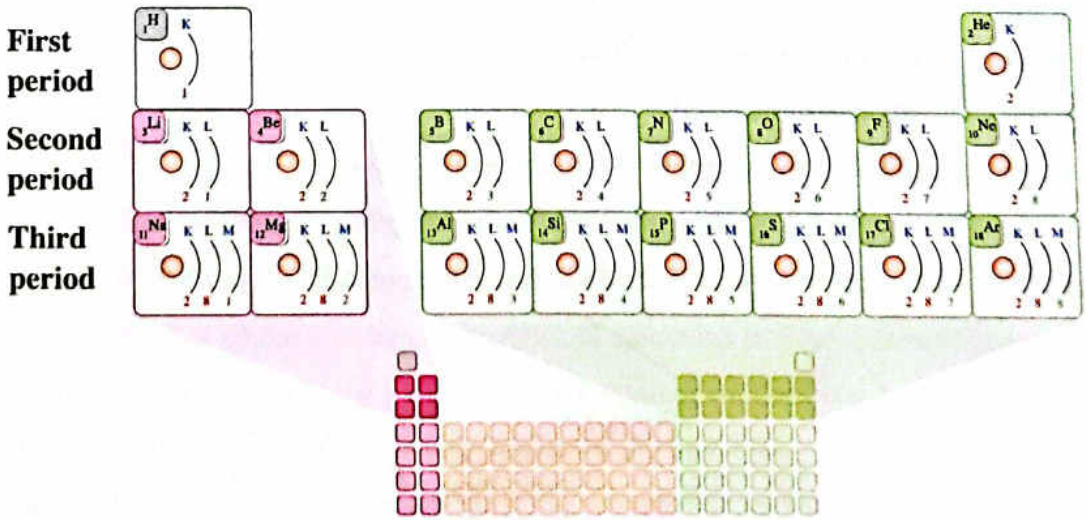
In the same group

The atomic number of an element increases from the element preceding it by (8).

[except lithium element ($_3$Li) that its atomic number increases than hydrogen ($_1$H) by (2)].

In the same period

The atomic number of an element increases from the element preceding it by (1).

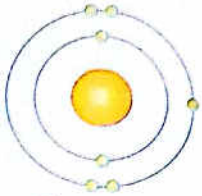


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G.R. ***Scientists cannot discover a new element between sulphur ($_{16}S$) and chlorine ($_{17}Cl$).***
Because the atomic number of an element is an integer and it increases in the same period from one element to the following element by one.

Exercise

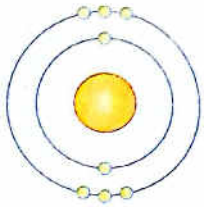
Study the opposite figure that shows the electronic configuration of element (Z) in the modern periodic table, then conclude the atomic number of :


Element (Z)

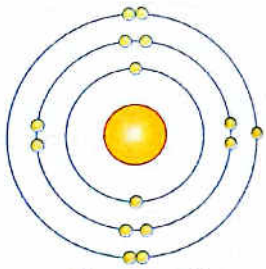
1. Element (A) which follows it in the same period.
2. Element (B) which follows it in the same group.

Answer

1. ∵ The atomic number of element (Z) = 2 + 5 = 7
   ∴ The atomic number of element (A) that follows it in the same period = 7 + 1 = 8


Element (A)

2. ∵ The number of energy levels of element (Z) = 2
   ∴ The number of energy levels of element (B) that follows it in the same group = 2 + 1 = 3
   ∵ The element (B) is located in the same group of element (Z)
   ∴ The number of electrons in the outermost energy level of both elements (B) and (Z) = 5
   ∴ The atomic number of element (B) = 2 + 8 + 5 = 15

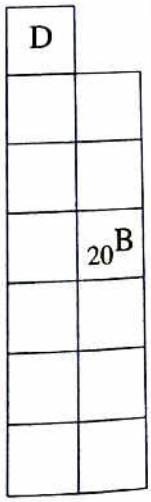

Element (B)

Question

The opposite figure represents a section of modern periodic table.

- Conclude the atomic number of :

1. Element (Y) that follows element (D) in the same group.
2. Element (X) that precedes element (B) in the same group.
3. Element (Z) that precedes element (B) in the same period.



TRY to answer worksheet **2** in the Notebook

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Remember Lesson One



The most important attempts for classifying elements are :

1. **Mendeleev's periodic table.**
2. **Moseley's periodic table.**
3. **Modern periodic table.**

- In Mendeleev's periodic table, elements are classified in an ascending order according to their atomic weights.
- In Moseley's periodic table, elements are classified in an ascending order according to their atomic numbers.
- The scientist Rutherford discovered that the nucleus of the atom contains positively charged protons.
- The scientist Bohr discovered the main energy levels of the atom (7 in the heaviest atoms).
- In the modern periodic table, elements are classified in an ascending order according to :
  - Their atomic numbers.
  - The way of filling their energy sublevels with electrons.
- The number of known elements in the modern periodic table till now is 118, where 92 elements are abundant in Earth's crust, while the rest are prepared artificially.

The modern periodic table consists of :

- 7 horizontal periods.
- 18 vertical groups.

- The modern periodic table is classified into 4 blocks (s, p, d, f).
- s-block is located on the left side of the periodic table, while p-block is located on the right side of the periodic table.
- d-block is located on the middle of the periodic table, while f-block is located below the periodic table.

Determination of the position of the element in the modern periodic table :

- The period number of the element = Number of energy levels occupied by electrons.
- The group number of the element = Number of electrons in the outermost energy level.
- Elements of the same group are **similar** in the number of electrons in the outermost energy level, so they are similar in their chemical properties.
- Elements of the same period are **different** in the number of electrons in the outermost energy level, so they are different in their chemical properties.

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Questions ? on lesson One

• Remember • Understand • Apply ⁂ Higher skills 🕮 School book questions.

Interactive Exercises

1. Choose the correct answer :

1. The number of elements in Mendeleev's periodic table is ..... elements.
   a. 92 b. 118 c. 76 d. 67
2. The scientist who left empty cells in his table to be filled with discovered elements in future is .....
   a. Moseley. b. Rutherford. c. Bohr. d. Mendeleev.
3. Mendeleev classified the elements of each main group into ..... subgroups.
   a. 2 b. 3 c. 4 d. 5
4. The nucleus of the atom contains .....
   a. positive electrons. b. negative electrons.
   c. negative protons. d. positive protons.
5. The scientist who discovered that the nucleus of the atom contains positively charged protons is .....
   a. Bohr. b. Mendeleev. c. Rutherford. d. Moseley.
6. 🕮 The scientist ..... discovered the main energy levels of the atom.
   a. Moseley b. Bohr c. Hofmann d. Mendeleev
7. The number of energy levels in the heaviest known atom reaches ..... levels till now.
   a. 5 b. 7 c. 8 d. 10
8. The number of known elements in the modern periodic table till now is .....
   a. 216 b. 118 c. 316 d. 16
9. The number of elements which exist in nature is ..... according to modern periodic table.
   a. 29 b. 118 c. 92 d. 102
10. The modern periodic table consists of ..... horizontal periods.
    a. 7 b. 10 c. 14 d. 18
11. The modern periodic table consists of ..... vertical groups.
    a. 7 b. 10 c. 14 d. 18
12. The modern periodic table consists of ..... main blocks.
    a. 3 b. 4 c. 7 d. 8
13. The elements which occupy the middle block (d) in the periodic table are called ..... elements.
    a. transition b. alkali c. acidic d. noble
14. The transition elements start to appear from the beginning of the ..... period.
    a. second b. third c. fourth d. fifth

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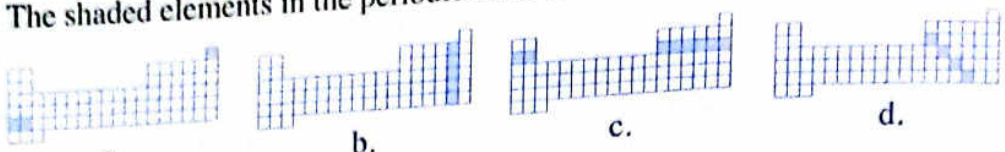
15. The block which contains the groups (1A) and (2A) in the periodic table is ..... block.
    a. s b. p c. d d. f
16. Elements of d-block are arranged in ..... groups.
    a. 2 b. 5 c. 6 d. 10
17. Lanthanides and actinides are located in the ..... block.
    a. s b. p c. d d. f
18. Noble gases are located in group .....
    a. 7A b. 8 c. 17 d. 18
19. Elements of group (6A) in the periodic table have the same number of .....
    a. protons inside the nucleus.
    b. energy levels around the nucleus.
    c. neutrons inside the nucleus.
    d. electrons in outermost energy level.
20. Elements of the same period in the modern periodic table have the same .....
    a. number of protons inside the nucleus.
    b. atomic number.
    c. number of energy levels.
    d. number of electrons in outermost energy level.
21. The number of negative electrons in the atom in its normal state equals .....
    a. the number of protons. b. the number of neutrons.
    c. twice the number of protons. d. half the number of neutrons.
22. In the periodic table, the elements which are similar in their properties and located in the same .....
    a. period. b. group. c. nucleus. d. energy level.
23. The element which is located in period (3) and group (3A) is .....
    a. $_{13}Al$ b. $_{5}B$ c. $_{11}Na$ d. $_{15}P$
24. The atomic number of the element that is located in period (4) and group (2A) is .....
    a. 4 b. 18 c. 12 d. 20
25. The number of elements of period (4) is ..... the number of elements of period (3).
    a. more than b. equal to c. less than d. half
26. The element whose atomic number (18) is .....
    a. transition element. b. inert gas. c. metallic element. d. halogen element.
27. The atomic number of the element that exists in group (7A) and period (2) is .....
    a. 12 b. 7 c. 9 d. 17
28. The element ($_{12}X$) is located in ..... of the periodic table.
    a. period (2) and group (2A) b. period (2) and group (3A)
    c. period (3) and group (2A) d. period (3) and group (4A)

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29. The chemical properties of calcium ($_{20}Ca$) are similar to those of .....

a. $_{19}K$ b. $_{12}Mg$ c. $_{25}Mn$ d. $_{3}Li$

30. The shaded elements in the periodic table ..... have similar chemical properties.



a. b. c. d.

2. Choose from column (B) what suits it in column (A) :

(A)	(B)
1. Mendeleev	a. added the zero group to the periodic table.
2. Rutherford	b. discovered the main energy levels of the atom.
3. Moseley	c. corrected the atomic weights of some elements that were estimated wrongly.
4. Bohr	d. discovered that the nucleus of the atom contains protons.
	e. arranged the elements according to the number of neutrons.

3. Choose from columns (B) & (C) what suit them in column (A) :

(A)	(B)	(C)
1. d-block elements	a. are located on the left side of the periodic table.	A. include lanthanides and actinides.
2. f-block elements	b. are located on the right side of the periodic table.	B. take the letter (B) "except group (8)".
3. s-block elements	c. are located in the middle of the periodic table.	C. consist of 3 columns.
4. p-block elements	d. are located below the periodic table.	D. end by (0) group.
	e. are located at the top of the periodic table.	E. are arranged in two groups (1A) and (2A).

4. Put (✓) or (✗) and correct the wrong ones :

1. The chemical elements have been categorized in a table to ease its study. ( )
2. The modern periodic table is the first real table for classifying elements. ( )
3. The elements with similar properties have been put in horizontal periods. ( )
4. The number of recorded elements in Mendeleev's table is about 103 elements. ( )
5. Mendeleev discovered that the properties of elements were repeated periodically by the beginning of each new group. ( )

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6. Mendeleev arranged the elements descendingly according to their atomic weights. ( )
7. Mendeleev put more than one element in the same place like nickel and cobalt. ( )
8. Moseley classified elements of each main group into two subgroups (A and B). ( )
9. The number of known elements till now is 92 elements. ( )
10. Rutherford discovered that the nucleus contains positively charged protons. ( )
11. The modern periodic table is classified into 5 blocks. ( )
12. Bohr discovered the main energy levels. ( )
13. Inert gases are located in zero group on the left side of the periodic table. ( )
14. Elements of d-block are arranged in 10 groups. ( )
15. Elements of p-block are organized in 5 groups. ( )
16. The transition elements groups are symbolized by (A). ( )
17. Elements of groups (A) are located in the middle of the periodic table. ( )
18. The number of energy levels occupied by electrons in the atom of the element indicates its group number. ( )
19. The period number of an element equals the number of electrons in the outermost energy level in its atom. ( )
20. The atomic number of every element increases by one electron over the element that precedes it in the same period. ( )
21. An element that is located in period (3) and group (2A), its atomic number is 13 ( )
22. Sodium ($_{11}$Na) element is located in group (1A) and period (3) in the modern periodic table. ( )
23. Both magnesium ($_{12}$Mg) and aluminium ($_{13}$Al) are located in the same group in the modern periodic table. ( )
24. Both nitrogen ($_{7}$N) and phosphorus ($_{15}$P) are located in the same group in the periodic table. ( )

5. Write the scientific term of each of the following :

1. • The first real periodic table for classifying elements.
   • A table in which the elements are arranged in an ascending order according to their atomic masses.
2. A table in which the elements are arranged in an ascending order according to their atomic numbers.
3. Positively charged particles found inside the nucleus of the atom.
4. A table in which the elements are arranged according to their atomic number and the way of filling their energy sublevels with electrons.
5. The vertical columns in the modern periodic table.
6. The horizontal rows in the modern periodic table.

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7. • They are indicated by the letters K , L , M , N , O , P , Q
   • Their numbers reach 7 in the heaviest known atoms.
8. • A group of elements found in the middle of the periodic table and includes ten groups.
   • A kind of elements symbolized by letter (B).
   • Elements of d-block in the modern periodic table.
   • Elements which appear starting from period (4) in the modern periodic table.
9. The block that contains the groups from (3A) to (0).
10. Elements of zero group in the modern periodic table.
11. The block that contains the series of lanthanides and actinides.
12. It indicates the number of energy levels, which are occupied by electrons in the atom of an element.
13. It indicates the number of electrons in outermost energy level in the atom of an element.
14. The number of positive protons inside the nucleus of the atom of an element.

6. Complete the following statements :

1. The most important attempts to classify elements are ..... , ... and ..... periodic tables.
2. Mendeleev discovered that the atomic weights of elements increase on moving from ..... side of the table to the ..... side in horizontal rows, which were known later as .....
3. One advantage of Mendeleev's table is correcting the wrongly estimated ..... of some elements.
4. 🕮 The scientist Mendeleev arranged the elements ascendingly according to ..... , while the scientist Moseley arranged them ascendingly according to .....
5. Moseley discovered, after studying ..... rays properties, that the periodicity of elements properties is related to their ..... and not to their .....
6. In Moseley's periodic table, the atomic number of each element increases by ..... than the element before it in the same.....
7. The Newzealand scientist Rutherford discovered that the nucleus of the atom contains positively charged .....
8. Moseley put ..... and ..... series below the periodic table.
9. The Danish scientist ..... discovered the main energy levels of the atom and their numbers reached ..... in the heaviest known atoms.
10. Each main energy level contains a definite number of energy .....

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11. In the modern periodic table, elements are arranged according to ..... and .....
12. The number of known elements till now is ..... elements, where ..... elements are found in the Earth's crust, while the rest are prepared .....
13. The modern periodic table consists of ..... horizontal periods and ..... vertical groups.
14. Elements of s-block are located on the ..... side of the periodic table and they are arranged in two groups which are ..... and .....
15. Elements of p-block are located on the ..... side of the periodic table and they are arranged in ..... groups.
16. The modern number of group (6A) is .....,while that of group (6B) is .....
17. Groups of d-block take letter ..... except group ....., which consists of ..... vertical columns.
18. The d-block contains ..... elements.
19. The transition elements start from period ..... in the modern periodic table and consist of ..... groups.
20. The modern number of zero group is ....., while that of group (5A) is .....
21. The vertical groups (1A) and (2A) are located on the ..... side, while the rest of (A) groups are found in the ..... side of the table.
22. The number of energy levels occupied by electrons in the atom of an element indicates its ..... number, while the number of electrons in the outermost energy level in the atom of an element indicates its ..... number.
23. If the atomic number of an element is 7, so it exists in period ..... and group ..... in the modern periodic table.
24. The atomic number of an element that is located in group (1A) and period (3) is .....
25. Element ($_{13}$X) is located in period ..... and group ..... in the modern periodic table.
26. An element whose 2nd energy level contains one electron so, it is located in the ..... period and group ..... in the modern periodic table.
27. An element, whose electronic configuration is (2 , 8) so, it exists in ..... group and period ..... in the modern periodic table.
28. An element exists in the 3rd period and group (2A) in the modern periodic table so, its atomic number equals .....
29. The elements ($_{3}$X) , ($_{11}$Y) , ($_{19}$Z) are similar in ..... number, while the elements ($_{3}$X) , ($_{4}$W) , ($_{5}$D) are similar in ..... number.

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7. Complete the following tables :

(1)

Element	Its atomic number	Its electronic configuration			Its position in the periodic table	
		K	L	M	Period No.	Group No.
$_6C$	.....	.....	.....	–	.....	.....
$_8O$	.....	.....	.....	–	.....	.....
Mg	.....	.....	.....	2	.....	.....
Cl	.....	.....	.....	.....	3	(7A)

(2)

Element	$_{20}Ca$	$_{15}P$	$_{10}Ne$	$_1H$
Electronic configuration :	K L M N +20	K L M +15	K L +10	K +1 ...
No. of energy levels :	.....	.....	.....	.....
Period number :	.....	.....	.....	.....
No. of electrons in the outermost level :	.....	.....	.....	.....
Group number :	.....	.....	.....	.....

8. Who ... ?

1. • Made the first real periodic table.
   • Predicted the discovery of new elements and determined the values of their atomic weights.
   • Corrected the atomic weights of some elements which were estimated wrongly.
   • Published his periodic table which includes 67 elements in his book "principles of chemistry".
   • Classified each main group into two subgroups (a and b).
2. Discovered that the nucleus of the atom contains positively charged protons.
3. Discovered that the periodic properties of elements are related to their atomic numbers and not to their atomic weights.
4. Added the zero group to mendeleev's periodic table.
5. Discovered the main energy levels.

9. Give reasons for :

1. Many attempts are made by scientists for classification of elements.
2. Mendeleev left gaps (empty places) in his periodic table.

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3. Mendeleev had to make a disturbance in the ascending order of atomic weights of some elements.
4. Mendeleev had to put more than one element in one cell.
5. Mendeleev classified the elements of each main group into two subgroups (A and B).
6. 📖 Elements of the same group have similar properties.
7. Both sodium ($_{11}$Na) and potassium ($_{19}$K) are located in the same group.
8. Both lithium ($_{3}$Li) and nitrogen ($_{7}$N) are located in the same period.
9. Scientists cannot discover a new element between sulphur ($_{16}$S) and chlorine ($_{17}$Cl).

10. Locate the following elements in the modern periodic table :

1. 📖 Hydrogen ($_{1}$H).
2. Nitrogen ($_{7}$N).
3. Carbon ($_{6}$C).
4. 📖 Neon ($_{10}$Ne).
5. Magnesium ($_{12}$Mg).
6. Chlorine ($_{17}$Cl).
7. 📖 Argon ($_{18}$Ar).
8. 📖 Calcium ($_{20}$Ca).
9. Oxygen ($_{8}$O).
10. Potassium ($_{19}$K).
11. Sulphur ($_{16}$S).
12. Boron ($_{5}$B).
13. Phosphorus ($_{15}$P).
14. 📖 Sodium ($_{11}$Na).
15. 📖 Aluminium ($_{13}$Al).

11. Mention the atomic numbers of the following elements :

1. An element lies in the first period and group (1A).
2. 📖 An element (X) lies in the first period and group zero.
3. An element lies in the third period and group (2A).
4. 📖 An element (Z) lies in the third period and group (7A).
5. An element lies in the third period and group (18).
6. 📖 An element (Y) lies in the second period and group (3A).

12. Choose the odd symbol out, then write the scientific term of others :

1. K / F / L / O / Q
2. s / k / d / f / p
3. $_{3}$Li / $_{11}$Na / $_{19}$K / $_{12}$Mg
4. $_{2}$He / $_{10}$Ne / $_{18}$Ar / $_{12}$Mg
5. $_{3}$Li / $_{6}$C / $_{4}$Be / $_{13}$Al

13. Write the number which indicates each of the following :

1. Number of elements in Mendeleev's periodic table.
2. Number of main energy levels in the heaviest known atoms till now.
3. Number of known elements in the modern periodic table till now.

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4. Number of elements available in Earth's crust according to modern periodic table.
5. Number of blocks in the modern periodic table.
6. Number of groups in s-block.
7. Number of groups in p-block.
8. Number of groups in d-block.

14. Compare between :

1. Mendeleev's periodic table, Moseley's periodic table and Modern periodic table [according to : the scientific principle of classification].
2. p-block and d-block [according to : the location in the modern periodic table – the number of groups of elements].
3. s-block and p-block [according to : the location in the modern periodic table – the number of groups of elements].
4. The element ($_{11}$Na) and element ($_{17}$Cl) in the modern periodic table [according to : the electronic configuration – period no. – group no. – the block symbol].

15. Variant questions :

(1) Write the contributions of the following scientists in chemistry :

1. Mendeleev. 2. Bohr. 3. Moseley. 4. Rutherford.

(2) What is the scientific principle upon which the elements are arranged in :

1. Mendeleev's periodic table ? 2. Moseley's periodic table ?

(3) 🕮 What is the scientific base upon which the elements of the modern periodic table classified ?

(4) Mention the advantages and disadvantages of Mendeleev's periodic table.

(5) The element ($_{17}$Y) is an element in the periodic table, find :

1. Its electronic distribution. 2. Its group number.
3. Its period number.

(6) You have 3 elements ($_{12}$X) , ($_{4}$Y) , ($_{20}$Z) that are located in the same group. Determine each of the following [Giving reason for your answer] :

1. The number of the group.
2. In which block are they located ?
3. Which element of them lies in the third period.

(7) You have 3 elements X , Y and Z of atomic numbers 12 , 13 and 14 respectivel answer the following :

1. Write their electronic distribution.
2. Determine their positions in the modern periodic table.
3. In which block each of them is located ?

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(8) A monovalent metallic element is located in the third period in the periodic table, its nucleus contains 12 neutrons.

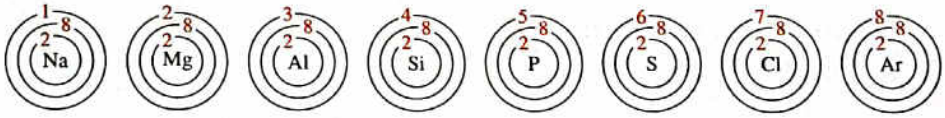
1. Calculate :
   (a) Its atomic number. (b) Its mass number.
2. Determine :
   (a) In which block is it located ? (b) Its group number.

16. Study the following figures, then answer the following questions :

(1) Is the opposite table a part of Mendeleev's periodic table or Moseley's periodic table ? Give a reason.

Li 7	Be 9.4	B 11	C 12	N 14	O 16	F 19
Na 23	Mg 24	Al 27.4	Si 28	P 31	S 32	Cl 35.5

(2) The following figures show the electronic configuration of elements of a certain period in the modern periodic table :



1. What is the number of this period ? Give a reason.
2. What is the number of the group of each of the following elements .....?
   (a) Magnesium. (b) Sulphur.
   (c) Argon.
3. Does this period contain an element from d-block ? Give a reason.
4. From this period, determine :
   (a) Elements of s-block. (b) Elements of p-block.

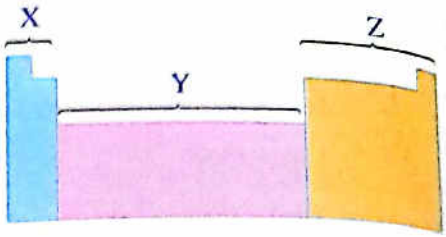
(3) The opposite figure represents a period of the modern periodic table :

A	B	C	$_6$D	E	X	Y	Z

1. What is the number of this period ?
2. What is the number of the group of element (B) ?
3. What is the atomic number of the element which follows the element (A) in the same group ?
4. What is the block that element (C) belongs to ?
5. What is the type of element (Z) ? What is the valency of element (Y) ?

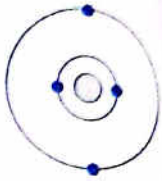
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(4) Look at the opposite figure, which represents a part of the modern periodic table, then answer the following :



1. What are the names of the elements blocks indicated by letters X , Y and Z ?
2. What is the number of groups of each block ?
3. What is the modern (new) number of zero group and group (7A) ?

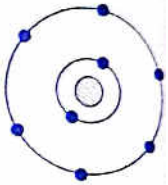
(5) Study the opposite figure that shows the electronic configuration of an element (X) in the modern periodic table :



Conclude the atomic number of the element which follows that element in :

1. The same period.
2. The same group.

(6) Use the represented figure, which indicates the electronic configuration of an element to answer the following :



1. What is the location of this element in the modern periodic table ?
2. What is the block that element belongs to ?
3. This element is located in the same group with ..... in the modern periodic table.

a. $_{5}B$ b. $_{16}S$ c. $_{19}K$ d. $_{10}Ne$

(7) The following table represents a part of the modern periodic table, answer the following questions :

$_{3}Z$																	
A												$_{13}D$	Q		M	Y	
						B							T				X

1. Write the letter(s) of the element(s) which is/are :
   (a) among transition elements.
   (b) located in period (3) and group (6A).
   (c) among noble gases.
   (d) considered among s-block.
   (e) Element (Q) considered among ..... block.

2. **Choose :**

(a) The letter (A) represents ..... element.

a. $_{9}F$ b. $_{8}O$ c. $_{12}Mg$ d. $_{11}Na$

(b) The letter (Y) represents ..... element.

a. $_{12}Mg$ b. $_{16}S$ c. $_{17}Cl$ d. $_{18}Ar$

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(c) The element (B) is located in ..... block.

a. s b. p c. d d. f

3. What is the atomic number of the element (M) ?

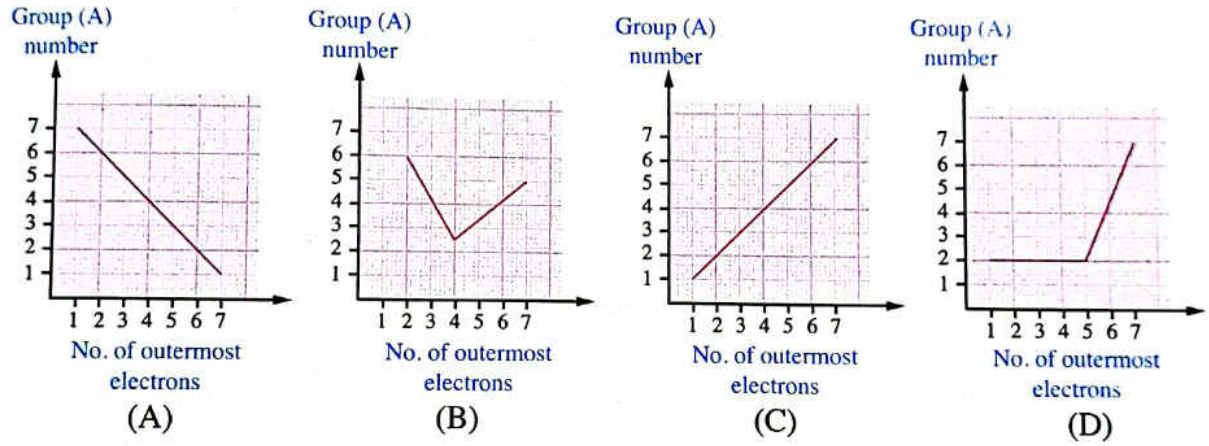
A
B
C

(8) In the opposite figure, if element (B) is located in period (3) and zero group.

1. Determine the atomic number of element (A).

2. (B) and (C) elements have the same number of .....

(9) Which of the following graphs represents the relation between the number of electrons in the outermost energy level and the group number, through (A) groups in the modern periodic table ?



17. Creative thinking :

Imagine a new form of classification of elements whose atomic numbers range between 1 : 20 such that each group contains similar elements.

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Thinking Skills Questions

1. Complete :

1. Elements whose atomic numbers from 1 : 18 occupy ..... periods in the modern periodic table.
2. (X) and (Y) are two successive elements located in the same period, if the atomic number of (Y) is 15 , so the atomic number of (X) may be ..... or .....
3. (A) and (B) are two successive elements in the same group, if the atomic number of (A) is 3, so the atomic number of (B) may be ..... or .....

2. Choose the correct answer :

1. The number of elements that are located in the third period of the modern periodic table is .....

   a. 2 b. 8 c. 18 d. 32

2. $(^{31}_{15}P)$, $(^{32}_{16}S)$ are two elements similar in the .....

   a. period number and number of neutrons.

   b. group number and number of protons.

   c. group number and number of neutrons.

   d. period number and number of protons.

3. The properties of the element, which has atomic number equals 17 are similar to the element which has atomic number equals .....

   a. 7 b. 9 c. 15 d. 20

4. An element which is located in the third period and group number 13, the number of neutrons in its nucleus equals 14 , so its mass number equals .....

   a. 30 b. 27 c. 24 d. 20

3. Give a reason for :

The modern periodic table consists of 7 horizontal periods.

4. Mention the atomic number of :

a. Metallic element (X) is divalent and located in the third period.

b. Inert gas which is located in the third period.

5. A metallic element (X) which is located in period (3) and when it reacts with oxygen, a compound its formula X_2O is formed :

a. What is the group in which this element locate ?

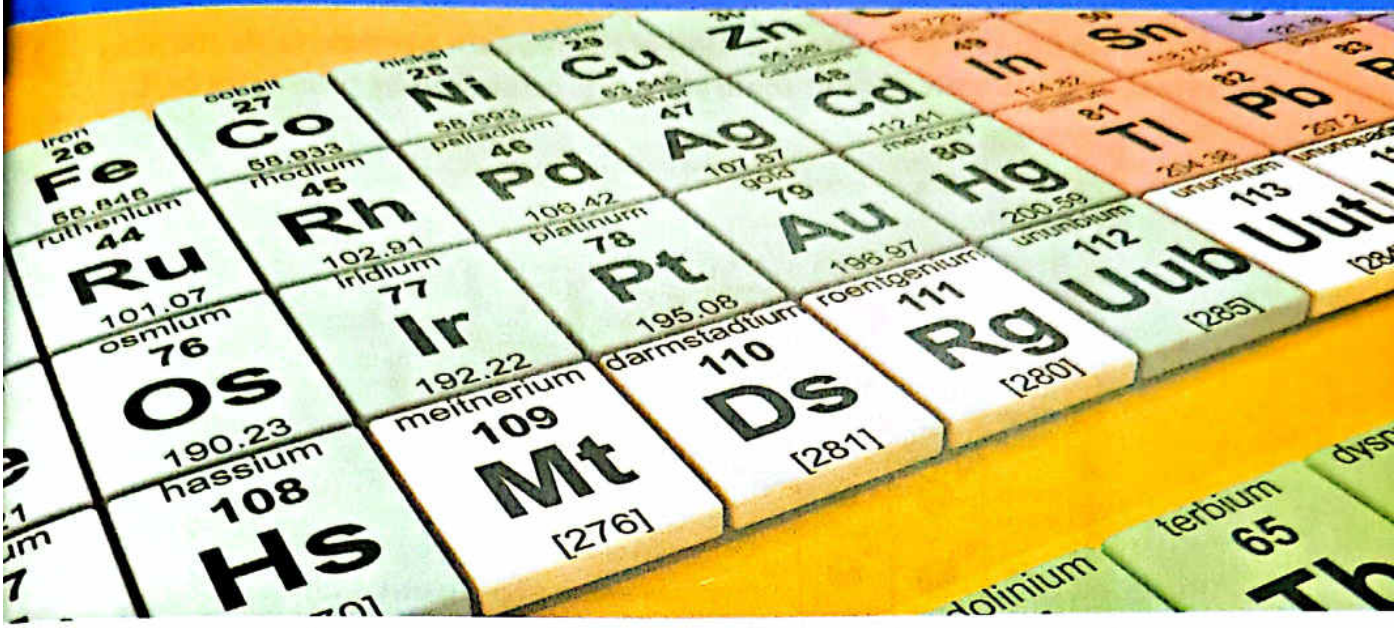
b. Calculate the atomic number of this element.

c. Determine the block of this element.

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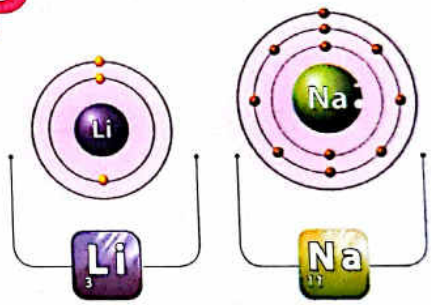
LESSON 2

Graduation of Elements Properties in the Modern Periodic Table



How does the electronic configuration of elements affect its properties ?

There is a graduation of the elements properties in the modern periodic table and there is a relation between these properties and the electronic configuration of elements.



For Example :

The graduation of some properties of the elements in groups (A) and periods.

Such as

- **First** — **Atomic size property.**
- **Second** — **Electronegativity property.**
- **Third** — **Metallic and nonmetallic property.**

FIRST Atomic size property

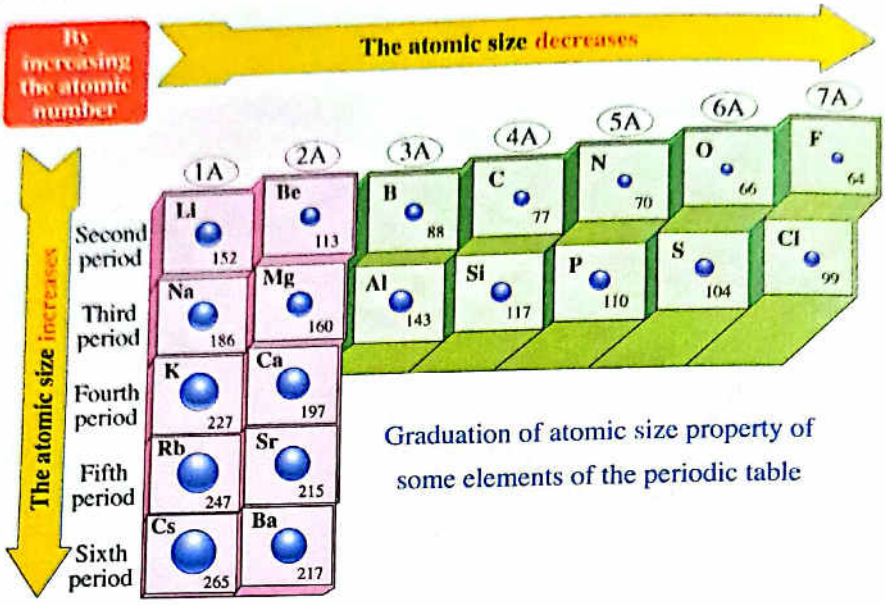
The atomic size is determined by knowing the **atomic radius** of the atom and its measuring unit is **picometre (Pm)**.

NB **Picometre = Part of million of the million part of a metre.**
[i.e. picometre = 1×10^{-12} m].

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Graduation of atomic size property of elements in the periodic table

* **The following figure represents a section of the modern periodic table showing the values of the atomic sizes of some elements estimated by picometre unit.**



Graduation of atomic size property of some elements of the periodic table

We find that :

Atomic size in the same period

The atomic size decreases from left to right in the same period G.R.

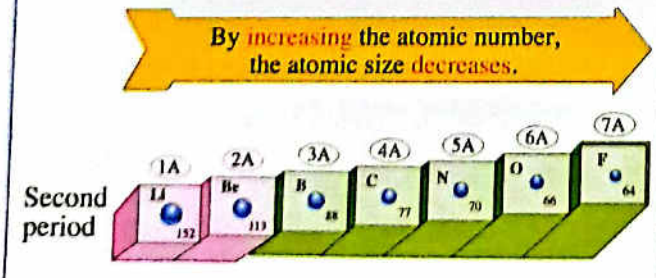
Because by increasing the atomic number in the same period, the attraction force between the positive nucleus and the negative electrons in the outermost energy level increases.

Atomic size in the same group

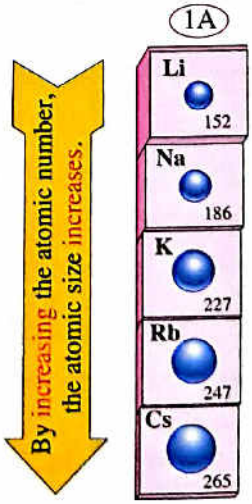
The atomic size increases from up to down in the same group G.R.

Because by increasing the atomic number in the same group, the number of energy levels occupied by electrons increases.

Examples



Atomic sizes for elements of second period

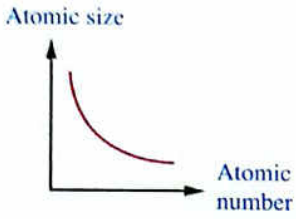


Atomic sizes for elements of group 1 (1A)

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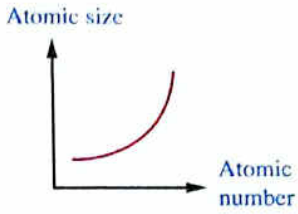
From the previous explanation, we conclude that :

The atomic size of the elements of the same period is inversely proportional to the atomic number.



The relation between the atomic size and the atomic number of the elements of the second period

The atomic size of the elements of the same group is directly proportional to the atomic number.



The relation between the atomic size and the atomic number of the elements of group 1 (1A)

Notes

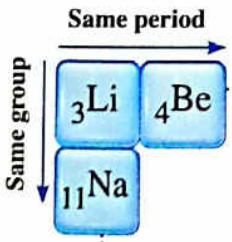
- **The elements of group (1A) are the largest atomic size elements in the modern periodic table, where :**

- **Fluorine (F)** is the smallest atomic size element in the modern periodic table, where it is located at the top right of the periodic table.

- **Cesium (Cs)** is the largest atomic size element in the modern periodic table, where it is located at the bottom left of the periodic table.

Application : The atomic size of lithium ($_3$Li) is greater than that of beryllium ($_4$Be) and smaller than that of sodium ($_{11}$Na). **Can you explain why ?**

$$_{11}Na > {}_3Li > {}_4Be$$



*Because by increasing the atomic number in **the same period**, the attraction force between the positive nucleus and the negative electrons in the outermost energy level increases, so the atomic size of lithium ($_3$Li) is greater than that of beryllium ($_4$Be).*

*Because by increasing the atomic number in **the same group**, the number of energy levels occupied by electrons increases, so the atomic size of lithium ($_3$Li) is smaller than that of sodium ($_{11}$Na).*

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Exercise

Arrange these elements ascendingly according to the atomic size :

$[{}_6C \ / \ {}_9F \ / \ {}_8O \ / \ {}_7N]$

Answer

${}_6C > {}_7N > {}_8O > {}_9F$

Idea of answer :

These elements are located in the same period and the atomic size of elements of the same period decreases by increasing the atomic number.

SECOND Electronegativity property

* You have known from the previous studies that the atoms of elements combine together by chemical bonds forming elements molecules or compounds molecules.
* The ability of atoms of elements differs to attract the electrons of the bond which is known as the electronegativity.

Electronegativity:

It is the ability of the atom in a covalent molecule to attract the electrons of the chemical bond towards itself.

* Each element has its own value of electronegativity.

G.R. ***Inert gases haven't electronegativity.***

Because they don't combine with other elements under the normal conditions.

The difference in electronegativity

The difference in electronegativity between combined elements plays a main role for determination the kind of the formed compound, it may be :

- **A polar compound.**
- **A non-polar compound.**
- **An ionic compound.**

▸ Enrichment information

*If the difference in electronegativity between elements of a covalent compound molecule equals **zero**, the bond in this molecule is described as **pure covalent bond**. As in diatomic gases like oxygen molecule (O_2).*

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* **Now,** we will study **the polar compounds only.**

Polar compounds

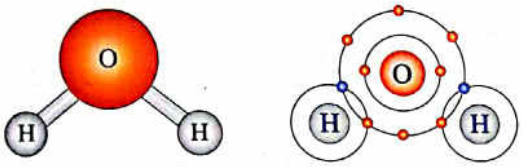
Polar compound:

It is a covalent compound, in which the difference in electronegativity between its elements is relatively high.

Examples :

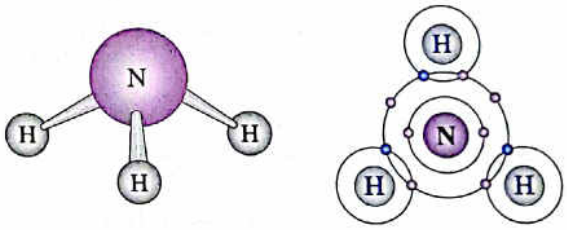
1 Water molecule (H_2O) :

- It consists of combination of **one oxygen** atom with **two hydrogen** atoms.



2 Ammonia molecule (NH_3) :

- It consists of combination of **one nitrogen** atom with **three hydrogen** atoms.



G.R.

- ***Water and ammonia are from polar covalent compounds.***
  Because the difference in electronegativity between the elements of each of them is relatively high.
- ***The polarity of water molecule is stronger than that of ammonia molecule.***
  Because the difference in electronegativity between oxygen and hydrogen in water molecule **is greater than** the difference between nitrogen and hydrogen in ammonia molecule.

For illustration

Compound	The difference in electronegativity between its elements
Water (H_2O)	Oxygen Hydrogen 3.5 – 2.1 = 1.4
Ammonia (NH_3)	Nitrogen Hydrogen 3 – 2.1 = 0.9

TRY to answer worksheet **3** in the Notebook

Question

Put (✓) or (✗) :

1. The atomic size increases in the same group by increasing the atomic number. ( )
2. Water molecule is a polar compound, because the difference in electronegativity between its elements is relatively low. ( )

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THIRD Metallic and nonmetallic property

Elements in the nature are classified according to their properties and electronic structure into four main kinds

1. Metals
2. Nonmetals
3. Metalloids (semi-metals)
4. Noble gases

1 Metals

Metals:

They are the elements, which have less than four electrons in their outermost energy levels.

For illustration

Berzelius was the first scientist who classified the elements into metals and nonmetals.

*** During the chemical reactions :**

- **The atoms of metallic elements tend to lose their outermost electrons (valency shells electrons) and change into positive ions** G.R.

  To reach the electronic configuration of the nearest inert gas preceding them in the periodic table.

Positive ion:

It is an atom of a metallic element which lost one electron or more during the chemical reaction.

- The positive ions carry a number of **positive charges** equals to the number of the **lost electrons**.

Examples :

Metal during the chemical reaction	Electronic configuration K	L	M	Positive ion	Electronic configuration K	L	The nearest preceding inert gas
Sodium ($_{11}$Na)	2	8	①	Na^+	2	8	Neon $_{10}$Ne (2 , 8)
Magnesium ($_{12}$Mg)	2	8	②	Mg^{+2}	2	8	
Aluminium ($_{13}$Al)	2	8	③	Al^{+3}	2	8	

NB The electronic configuration of **(Na^+) , (Mg^{+2})** and **(Al^{+3})** ions is similar to the electronic configuration of neon **($_{10}$Ne)** atom.

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2 Nonmetals

Nonmetals:

They are the elements, which have more than four electrons in their outermost energy levels.

*** During the chemical reactions :**

- **The atoms of nonmetallic elements tend to gain electrons and change into negative ions** G.R.
  To reach the electronic configuration of the nearest inert gas following them in the periodic table.

Negative ion:

It is an atom of a nonmetallic element which gained one electron or more during the chemical reaction.

- The negative ions carry a number of **negative charges** equals to the number of the **gained electrons**.

Examples :

Nonmetal during the chemical reaction	Electronic configuration K	L	M	Negative ion	Electronic configuration K	L	M	The nearest following inert gas
Phosphorus ($_{15}$P)	2	8	⑤	P^{-3}	2	8	8	Argon $_{18}$Ar (2 , 8 , 8)
Sulphur ($_{16}$S)	2	8	⑥	S^{-2}	2	8	8	
Chlorine ($_{17}$Cl)	2	8	⑦	Cl^-	2	8	8	

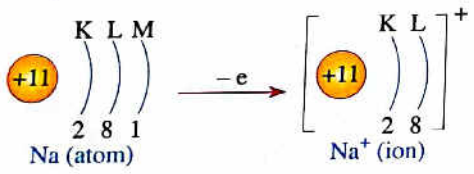
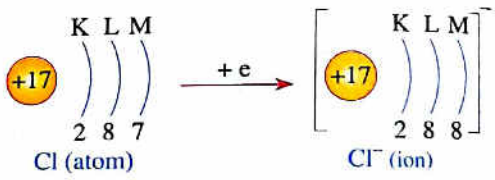
NB The electronic configuration of (P^{-3}) , (S^{-2}) and (Cl^-) ions is similar to the electronic configuration of argon ($_{18}$Ar) atom.

G.R.

- ***Both sodium ion (Na^+) and fluoride ion (F^-) have the same number of electrons.***
  Because during the chemical reaction, sodium atom ($_{11}$Na) loses one electron and fluorine atom ($_9$F) gains one electron, so the number of electrons becomes 10 electrons in each of the two ions.
- ***During the chemical reaction, chlorine ($_{17}$Cl) atom tends to form a negative ion.***
  Because ($_{17}$Cl) is a nonmetal element, so it tends to gain one electron and changes into a negative ion.

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➲ Comparison between the positive ion and the negative ion :

The positive ion	The negative ion
- It is an atom of a **metallic** element that **loses** one electron or more during the chemical reaction.	- It is an atom of a **nonmetallic** element that **gains** one electron or more during the chemical reaction.
- The number of its electrons is **less than** that of its protons.	- The number of its electrons is **more than** that of its protons.
- It carries a number of **positive charges equals to** the number of the **lost electrons**.	- It carries a number of **negative charges equals to** the number of the **gained electrons**.
- The number of its energy levels is **less than** the number of energy levels in its atom.	- The number of its energy levels is **equal to** the number of energy levels in its atom.
- Its electronic configuration is similar to that of the nearest inert gas **preceding** its atom in the periodic table.	- Its electronic configuration is similar to that of the nearest inert gas **following** its atom in the periodic table.
Example : 	**Example :** 

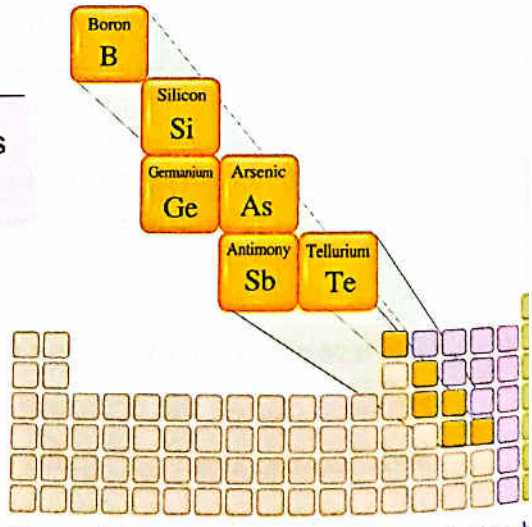
3 Metalloids (semi-metallic elements)

Metalloids are located in **p-block**.

Metalloids:

They are the elements, which have the properties of both metals and nonmetals.

They are :
- Boron (B).
- Silicon (Si).
- Germanium (Ge).
- Arsenic (As).
- Antimony (Sb).
- Tellurium (Te).



The position of metalloids in the periodic tab

For illustration

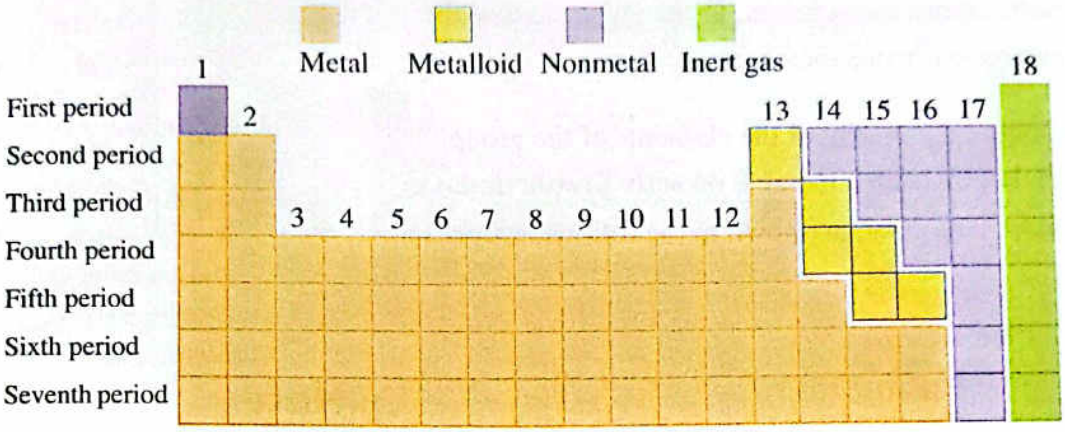
It is difficult to know the metalloids from their electronic structure due to the difference in numbers of the electrons in their valencies shells as shown in the opposite table :

$_{5}B$	$_{14}Si$	$_{33}As$	$_{52}Te$
3	4	5	6

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Graduation of metallic and nonmetallic property of elements in the periodic table

* **We conclude from the following figure which represents a section of the modern periodic table that :**



In the same period

- Each period starts with a **strong metal** "except the first period".

  By increasing the atomic number (as we go from left to right), the **metallic** property **decreases** till we reach **metalloids**.
- Then the **nonmetallic** property appears and **increases** by increasing the atomic number till we reach the **strongest nonmetal** in group 17 (7A).
- Then the **period** ends with an **inert gas** in group 18

Application :

The graduation of metallic and nonmetallic property within third period.

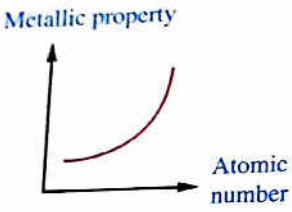
By increasing the atomic number, the metallic property decreases and nonmetallic property increases.

Third period	$_{11}Na$ Sodium	$_{12}Mg$ Magnesium	$_{13}Al$ Aluminium	$_{14}Si$ Silicon	$_{15}P$ Phosphorus	$_{16}S$ Sulphur	$_{17}Cl$ Chlorine	$_{18}Ar$ Argon
Electronic configuration	2,8,1	2,8,2	2,8,3	2,8,4	2,8,5	2,8,6	2,8,7	2,8,8
Kind of element	Strong metal	Metal	Metal	Metalloid	Non-metal	Non-metal	Strong non-metal	Inert gas

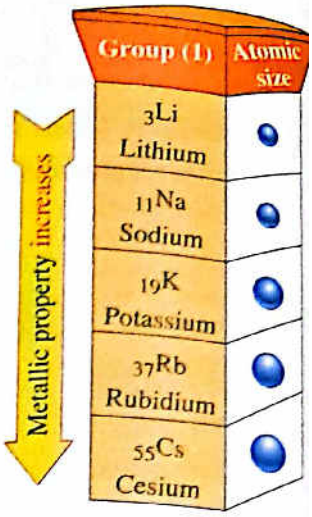
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In group which starts with a metal

- The metallic property **increases** gradually as we go from top to bottom as in group (1A) **G.R.** Because as the atomic number increases, the atomic size of metallic elements increases, so the ability to lose the outermost electrons increases.
- The metallic property of the elements of the group which begins with a metal is **directly proportional** to the atomic number, as shown in the following figure :



The relation between the metallic property and the atomic number of the elements of group (1A)



Arrangement of group (1) according to metallic proper

Note

In group (1A) :

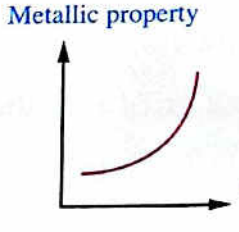
- ***Lithium (Li)*** is the *lowest* element in the metallic property.
- ***Cesium (Cs)*** is the *strongest* element in the metallic property.

G.R. ***Cesium is considered as one of the strongest metallic elements.***

Because cesium has the largest atomic size, so it can lose its valency electron easily.

Exercise

Mention with drawing, the type of the relation between atomic size and metallic property for elements of the same group.



The relation between the metallic property and the atomic size

Answer

There is a direct relationship between the atomic size of an element and its metallic property.

i.e. *By increasing the atomic size, the metallic property increases.*

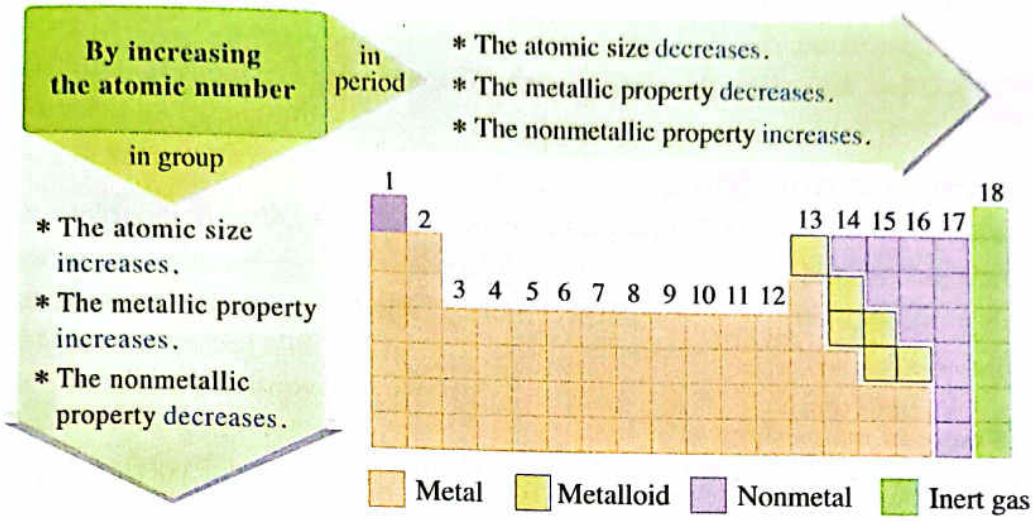
Note

In nonmetallic groups (groups which start with nonmetal) :
The nonmetallic property decreases gradually as we go from top to bottom as in group (7A).

TRY To Answer Worksheet in the Notebook

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* **The following figure shows the graduation of properties of elements in the modern periodic table :**



Question

The following figure represents a section of the periodic table.

																	He
Li														O	F	Ne	
Na												Al			S	Cl	Ar
K																	

Determine the symbol which indicates the following :

1. The largest atomic size element of the third period. (.....)
2. An element, whose electronic configuration is similar to the electronic configuration of the ion of (K) element. (.....)
3. A nonmetal, whose electronic configuration of its ion is similar to the electronic configuration of (Ar) element. (.....)
4. An element, whose electronic configuration of its ion is similar to the electronic configuration of (He) element. (.....)
5. A metal, whose electronic configuration of its ion is similar to the electronic configuration of (Ne) element. (.....)

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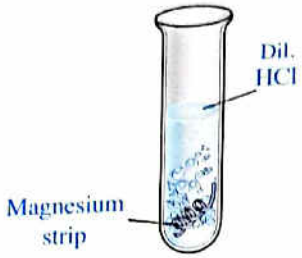
Chemical properties of metals

* To know the chemical properties of metals, do the following activities :

Activity (1) Reaction of metals with dilute acids :

Substances and tools:

- A test tube.
- A magnesium strip.
- Dilute hydrochloric acid.

Step	Illustrating figure	Observation
Put a piece of magnesium strip in a test tube and add some dilute hydrochloric acid (HCl).		Evolving of gas bubbles.

Conclusion:

Active metals such as magnesium (Mg) react with dilute acids (as hydrochloric acid) forming ***a salt of an acid*** and ***hydrogen gas*** which burns with a pop sound on approaching a burning match to it.

$$\text{Active metal} + \text{Acid} \xrightarrow{\text{dil.}} \text{Salt of an acid} + \text{Hydrogen gas}$$

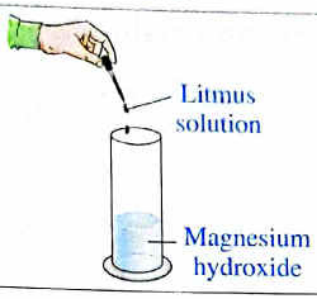
$$\underset{\text{Magnesium}}{Mg} + \underset{\text{Hydrochloric acid}}{2HCl} \xrightarrow{\text{dil.}} \underset{\text{Magnesium chloride}}{MgCl_2} + \underset{\text{Hydrogen gas}}{H_2\uparrow}$$

Activity (2) Reaction of metals with oxygen :

Substances and tools:

- A magnesium strip.
- A jar filled with oxygen.
- Water.
- Violet litmus solution.

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Steps	Illustrating figures	Observations
1. Ignite one end of a magnesium strip until it burns then put it inside a jar filled with oxygen gas.		- Magnesium strip burns with a bright light and changes into a powder (magnesium oxide).
2. Add some water to the produced substance (magnesium oxide) with shaking, then add drops of violet litmus solution.		- Magnesium oxide dissolves in water. - The solution turns into blue.

Conclusion:

- Metals such as magnesium (Mg) react with oxygen forming ***metal oxides,*** which are known as ***"Basic oxides"***.

Metal + Oxygen $\xrightarrow{\text{heat}}$ Basic oxide

$2Mg + O_2 \xrightarrow{\Delta} 2MgO$

Magnesium + Oxygen → Magnesium oxide

- Some basic oxides (such as magnesium oxide) dissolve in water forming ***alkaline solutions*** which turn violet litmus solution into ***blue***.

Basic oxide + Water → Alkali

$MgO + H_2O \longrightarrow Mg(OH)_2$

Magnesium oxide + Water → Magnesium hydroxide

Basic oxides:

They are metallic oxides, some of them dissolve in water forming alkaline solutions.



Alkaline solution turns litmus solution into blue

G.R. ***All bases aren't considered alkalis.***

Because alkalis are bases dissolve in water, but not all bases dissolve in water.



Enrichment information

A mixture of MgO, $MgCl_2$ and H_2O is used in making stones for making blades of knives which are very thin (sharpening knives).

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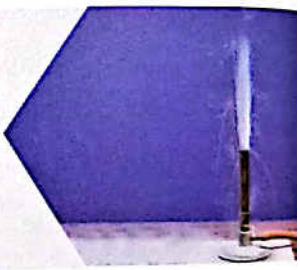
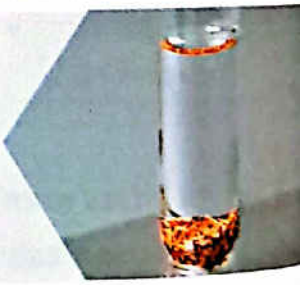
Chemical activity series

Chemical activity series:
It is the arrangement of metals in a descending order according to the degree of their chemical activity.

* Metals are arranged according to the degree of their chemical activity in a table known as "Chemical activity series".

* **The following table shows the difference in the behaviour of some metals with water according to their location in the chemical activity series.**

The degree of chemical activity decreases

Metals	Reaction with water	
K Potassium Na Sodium	They **react instantly** with water and hydrogen gas evolves which burns with a pop sound.	
Ca Calcium Mg Magnesium	They **react very slowly** with cold water.	
Zn Zinc Fe Iron	They **react at high temperatures** with hot water vapour only.	
Cu Copper Ag Silver	They **don't react** with water.	

Enrichment information

The rise in sodium ion concentration (Na^+) in the body causes a rise in blood pressure, so high blood pressure patients are advised to reduce table salt in their food.

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Life application *Steps to clean silver tools :*

1. Cover the bottom of a plastic plate with an aluminium paper (foil), whereas the bright surface is upward.
2. Pour the boiling water in the plate and then add 3 spoons of baking powder.
3. Immerse the silver tools which you want to clean in water, then leave the tools for 15 minutes.
4. Dry the tools after rinsing them with boiling water, then polish them with a piece of wool.



Glittering silver plate

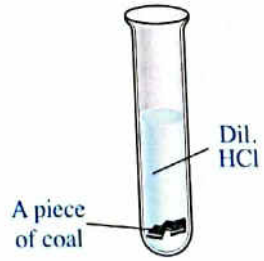
Chemical properties of nonmetals

* **To know the chemical properties of nonmetals, do the following activities :**

Activity 3 Reaction of nonmetals with dilute acids :

Substances and tools:

- A test tube.
- A piece of coal (carbon).
- Dilute hydrochloric acid (HCl).

Step	Illustrating figure	Observation
Put a piece of coal (carbon) in a test tube then add some dilute (HCl) to it.		No reaction takes place.

Conclusion:

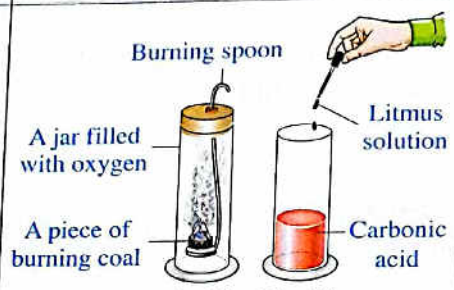
Nonmetals (such as carbon) don't react with dilute acids (such as HCl).

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Activity 4 Reaction of nonmetals with oxygen :

Substances and tools:

- A piece of coal (carbon).
- A burning spoon.
- A jar filled with oxygen.
- Water.
- Violet litmus solution.

Steps	Illustrating figures	Observations
1. Burn a piece of coal in a burning spoon and put it after complete burning in a jar filled with oxygen. 2. Add some water to the jar with shaking then add drops of violet litmus solution.	 Fig. (1) Fig. (2)	- The glow increases. - The produced substance from burning (carbon dioxide) dissolves in water and the solution turns into red.

Conclusion:

- Nonmetals such as carbon (C) react with oxygen forming ***nonmetal oxides,*** most of them are known as ***"Acidic oxides"***.

$$\text{Nonmetal} + \text{Oxygen} \xrightarrow{\text{heat}} \text{Acidic oxide}$$

$$\underset{\text{Carbon}}{C} + \underset{\text{Oxygen}}{O_2} \xrightarrow{\Delta} \underset{\text{Carbon dioxide}}{CO_2}$$

- Acidic oxides (such as carbon dioxide) dissolve in water forming ***acidic solutions*** which turn violet litmus solution into ***red***.

$$\text{Acidic oxide} + \text{Water} \longrightarrow \text{Acid}$$

$$\underset{\text{Carbon dioxide}}{CO_2} + \underset{\text{Water}}{H_2O} \longrightarrow \underset{\text{Carbonic acid}}{H_2CO_3}$$

Acidic oxides:

They are nonmetallic oxides, which dissolve in water forming acidic solutions.



Acidic solution turns litmus solution into red

G.R. ***Some oxides as aluminium oxide (Al_2O_3) are known as "Amphoteric oxides".***
Because they can react with acids as basic oxides and also react with bases as acidic oxides giving in the two cases salt and water.

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Exercise

How can you differentiate between calcium oxide solution and sulphur trioxide solution.

Answer

By adding violet litmus solution :
- The calcium oxide solution turns into blue.
- The sulphur trioxide solution turns into red.

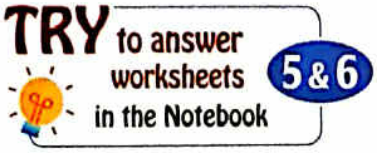


Comparison between metals and nonmetals :

Metals	Nonmetals
- They are the elements, which have **less than four electrons** in their outermost energy levels.	- They are the elements, which have **more than four electrons** in their outermost energy levels.
- They tend to **lose** electrons and change into **positive** ions.	- They tend to **gain** electrons and change into **negative** ions.
- They are characterized by **largest** atomic sizes.	- They are characterized by **smallest** atomic sizes.
- Some of them **react** with dilute acids forming a salt of an acid and hydrogen gas.	- They **don't react** with dilute acids.
- They react with oxygen forming **basic oxides**.	- They react with oxygen forming **acidic oxides**.

Comparison between basic oxides and acidic oxides :

Basic oxides	Acidic oxides
- They are **metal** oxides.	- They are **nonmetal** oxides.
- They are formed by the reaction of **metal** with oxygen.	- They are formed by the reaction of **nonmetal** with oxygen.
- Some of them dissolve in water forming alkaline solutions.	- They dissolve in water forming acidic solutions.
- Their solutions turn violet litmus solution into **blue**.	- Their solutions turn violet litmus solution into **red**.
- **Ex.:** Na_2O & MgO	- **Ex.:** CO_2 & SO_2



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Remember Lesson Two



Atomic size :

- Atomic size is determined by knowing the atomic radius.
- In periods, by increasing the atomic number, the atomic size decreases.
- In groups, by increasing the atomic number, the atomic size increases.

Electronegativity :

It is the ability of the atom in a covalent molecule to attract the electrons of the chemical bond towards itself.

Polar compounds :

They are covalent compounds in which the difference in electronegativity between their elements is relatively high such as water molecule (H_2O) and ammonia molecule (NH_3).

Metals :

They are the elements, which have less than four electrons in their outermost energy levels

Nonmetals :

They are the elements, which have more than four electrons in their outermost energy level

Metalloids :

They are the elements, which have the properties of both metals and nonmetals.

Basic oxides :

They are metallic oxides, some of them dissolve in water forming alkaline solutions.

Chemical activity series :

It is the arrangement of metals in a descending order according to the degree of their chemical activity.

Acidic oxides :

They are nonmetallic oxides, which dissolve in water forming acidic solutions.

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Questions ? on lesson Two

• Remember • Understand • Apply ⁂ Higher skills [L] School book questions

Interactive Exercises

1. Choose the correct answer :

1. The atomic size is determined by knowing the atomic radius of the atom and its measuring unit is .....
   a. metre. b. millimetre. c. nanometre. d. picometre.
2. In period (2), the atomic size of oxygen ($_8O$) is greater than that of .....
   a. $_6C$ b. $_9F$ c. $_3Li$ d. $_5B$
3. In the same period, by increasing the atomic number, the .....
   a. atomic size decreases. b. atomic size increases.
   c. atomic radius increases. d. atomic size doesn't change.
4. Which of the following elements is a metallic element ? .....
   a. $_{12}Mg$ b. $_{17}Cl$ c. $_8O$ d. $_{10}Ne$
5. During the chemical reactions, metal atoms tend to .....
   a. lose electrons and change into negative ions.
   b. gain electrons and change into negative ions.
   c. lose electrons and change into positive ions.
   d. gain electrons and change into positive ions.
6. An element (X), whose atomic number is 13 so, the number of electrons in its ion is .....
   a. 8 b. 10 c. 11 d. 12
7. The electronic configuration of sodium ion (Na^+) is similar to that of .....
   a. $_7N$ b. $_{18}Ar$ c. $_{10}Ne$ d. $_8O$
8. The electronic configuration of magnesium ion (Mg^{+2}) is similar to all the following except .....
   a. Na^+ b. $_{10}Ne$ c. Al^{+3} d. $_{18}Ar$
9. If you know that the atomic number of an element = 11, which of the following figures represents the electronic configuration of its ion ? .....

   a. 

   b. 

   c. 

   d. 

10. The difference between chlorine ($_{17}Cl$) atom and chloride ion (Cl^-) is the number of .....
    a. energy levels. b. protons. c. neutrons. d. electrons.
11. [L] All of the following elements are from semi-metals except .....
    a. tellurium. b. silicon. c. boron. d. bromine.

12. Each period in the modern periodic table starts with .....
a. metallic element. b. semi-metallic element.
c. nonmetallic element. d. inert gas.

13. By increasing the atomic number within the period, all the following properties take place except .....
a. metallic property decreases. b. nonmetallic property increases.
c. atomic size decreases. d. atomic size increases.

14. By increasing the atomic number within the group (1A), all the following properties take place except .....
a. atomic size decreases. b. nonmetallic property decreases.
c. metallic property increases. d. atomic size increases.

15. ..... is the lowest element in the metallic property in group (1A).
a. Na b. Cs c. K d. Li

16. Sodium oxide is from ..... oxides.
a. acidic b. basic c. amphoteric d. nonmetal

17. Magnesium reacts with oxygen giving .....
a. $Mg(OH)_2$ b. $MgCl_2$ c. MgO d. Mg_2O

18. All of the following metals react with water except .....
a. K b. Cu c. Na d. Mg

19. When sodium reacts with water, ... gas evolves.
a. N_2 b. O_2 c. H_2 d. CO_2

20. Which of the following elements reacts with dilute hydrochloric acid ? .....
a. C b. Cl_2 c. S d. Zn

21. Which of the following is an acidic oxide ? .....
a. MgO b. CO_2 c. FeO d. CuO

22. The oxides of the 3rd period elements are as the following .....
a. acidic, amphoteric, then basic. b. acidic , basic , then amphoteric.
c. basic , acidic , then amphoteric. d. basic , amphoteric , then acidic.

23. Burning of carbon in air produces .....
a. CO b. CO_2 c. H_2CO_3 d. CuO

24. The oxide which dissolves in water and produces an acid is .....
a. MgO b. FeO c. CuO d. CO_2

2. Put (✓) or (✗) and correct the wrong ones :

1. The atomic size increases in the same group by increasing the atomic number. ( )
2. The atomic size of chlorine ($_{17}Cl$) is greater than that of magnesium ($_{12}Mg$). ( )
3. The atomic size decreases in periods as the atomic number increases. ( )
4. The chemical bond is described as a polar covalent bond, when the difference in electronegativity between the two bonded elements is equal to zero. ( )

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5. Water and ammonia are from polar compounds. ( )
6. Water molecule is a polar compound because the difference in electronegativity between its elements is relatively low. ( )
7. The electronic structure of the positive ion is similar to that of the nearest following inert gas. ( )
8. Both oxygen ion (O^{-2}) and argon atom (Ar) have the same electronic configuration. ( )
9. During the chemical reaction, ($_{12}Mg$) atom tends to form positive ion that carries one positive charge. ( )
10. Each period starts with a weak metal. ( )
11. Metalloids have the properties of metals and nonmetals. ( )
12. By increasing the atomic number within a period, the metallic property increases. ( )
13. The metallic property in group (1A) increases as we go from up to down. ( )
14. Magnesium reacts with dilute (HCl) and (Cl_2) gas evolves. ( )
15. Magnesium oxide is a basic oxide. ( )
16. Metals are arranged in an ascending order according to the degree of their chemical activity in the chemical activity series. ( )
17. Sulphuric acid is produced when carbon dioxide gas dissolves in water. ( )
18. Iron is more chemically active than silver and less active than calcium. ( )
19. Copper and zinc don't react with water. ( )
20. Some basic oxides dissolve in water forming acidic solutions. ( )
21. Burning a piece of coal gives (CO) gas which is an acidic oxide. ( )
22. The solutions produced from dissolving of nonmetal oxides in water turn the violet litmus solution into red. ( )
23. Some alkalis dissolve in water forming bases. ( )

3. Write the scientific term of each of the following :

1. • A part of million of the million part of a metre.
   • The measuring unit of atomic radius which is used as a measure for the atomic size.
2. The ability of the atom in a covalent molecule to attract the electrons of the chemical bond towards itself.
3. Covalent compounds, in which the difference in electronegativity between their elements is relatively high.
4. The polar compound, which consists of one oxygen atom and two hydrogen atoms.
5. • A kind of elements in which their valency shells contain less than 4 electrons.
   • Elements whose atoms tend to lose electrons during chemical reactions and change into positive ions.

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6. An atom of a metallic element, which loses one electron or more during the chemical reaction.
7. • A kind of elements, in which their valency shells contain more than 4 electrons.
   • Elements whose atoms tend to gain electrons during chemical reactions and change into negative ions.
8. An atom of a nonmetallic element, which gains one electron or more during the chemical reaction.
9. The inert gas which has the same electronic structure of sodium ion (Na^+).
10. Elements which have the properties of metals and nonmetals.
11. A group contains the strongest nonmetals.
12. A solution used to differentiate between acids and bases.
13. Oxides which dissolve in water forming alkaline solutions.
14. • Substances which turn the litmus solution into blue.
    • Substances resulted from dissolving of metal oxides in water.
15. A kind of metal oxides reacts with acids as basic oxides and also reacts with bases as acidic oxides.
16. The arrangement of metals in a descending order according to the degree of their chemical activity.
17. • Substances which turn the litmus solution into red.
    • Substances resulted from dissolving of nonmetal oxides in water.
18. The nonmetal oxides which dissolve in water forming acidic solutions.

4. Complete the following statements :

1. The atomic size is determined by knowing the ..... and its measuring unit is .....
2. By increasing the atomic number, the values of atomic sizes ..... in the same period of the periodic table.
3. By increasing the atomic number in the same group, the atomic size ..... due to the increase of the number of .....
4. The atomic size of lithium ($_3Li$) atom is ..... than that of nitrogen ($_7N$) atom and ..... than that of sodium ($_{11}Na$) atom.
5. ..... is the ability of the atom in a covalent molecule to attract the ..... of the chemical bond towards itself.
6. ..... and ..... are examples of polar compounds.
7. The polarity of water is ..... than that of ammonia as the difference in ..... between elements of water is ..... than that between elements of ammonia.
8. Elements are classified into four main kinds which are metals, nonmetals, ... and .....
9. The outermost energy level of metallic elements contains ..... than four electrons, while that of nonmetallic elements contains ..... than four electrons.

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10. During the chemical reaction, nonmetal atom tends to ..... electrons and changes into .....
11. During the chemical reaction, magnesium ($_{12}Mg$) atom loses ..... electrons and changes into ..... ion, which carries ..... positive charges.
12. The ..... ion carries a number of ..... equals to the number of lost electrons.
13. The number of ..... charges of the negative ion is equal to the number of gained .....
14. ..... have the properties of both metals and nonmetals.
15. By increasing the atomic number within a period, the metallic property ....., while the nonmetallic property .....
16. Each period in the modern periodic table starts with ..... except the first period, and ends with .....
17. The most metallic element in group (1A) is .....
18. By increasing the atomic number within group (1A), the metallic property .....
19. Some metals react with dilute acids giving ..... and ..... gas evolves.
20. Some basic oxides dissolve in water forming ....., which turn the litmus solution into .....
21. Metals are arranged in a ..... order according to the degree of their ..... in chemical activity series.
22. ..... metal reacts with hot water vapour, while ..... metal doesn't react with water.
23. ..... is an example of nonmetals which doesn't react with dilute acids.
24. Metal oxides are called ..... oxides, while nonmetal oxides are called ..... oxides.
25. Nonmetal oxides dissolve in water forming ....., which turn the litmus solution into .....

5. Complete the following chemical equations :

1. $2Mg + O_2 \xrightarrow{\Delta}$ .....
2. ..... + ... $\longrightarrow Mg(OH)_2$
3. $Mg + 2HCl \xrightarrow{dil.}$ ..... + ...
4. $C + O_2 \xrightarrow{\Delta}$ .....
5. ..... + ... $\longrightarrow H_2CO_3$

6. Complete the following table :

Element	Its electronic configuration	Its kind	Formula of its oxide	Type of its oxide
1. $_{11}Na$	.....	Metal	Na_2O	.....
2. $_{12}Mg$	.....	.....	.....	.....
3. $_{6}C$	.....	Nonmetal	.....	.....

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7. Give a reason for each of the following :

1. The atomic size decreases in the same period by increasing the atomic number.
2. The atomic size increases by increasing the atomic number within the same group.
3. Water molecule is from the polar covalent molecules.
4. Water is more polar than ammonia.
5. Ammonia (NH_3) is considered as a polar covalent compound.
6. During the chemical reactions, sodium ($_{11}Na$) atom tends to form a positive ion.
7. During the chemical reaction, chlorine ($_{17}Cl$) atom tends to form a negative ion.
8. Both sodium ion (Na^+) and fluoride ion (F^-) have the same electronic configuration.
9. The metallic property for elements of group (1A) increases by increasing the atomic number.
10. Cesium (Cs) is considered as one of the strongest metallic elements.
11. Solution of magnesium oxide turns the violet litmus solution into blue.
12. Potassium reacts instantly with water, while copper doesn't react with water.
13. Solution of carbon dioxide turns the violet litmus solution into red.
14. Aluminium oxide is considered as an amphoteric oxide.

8. What is meant by ... ?

1. Electronegativity.
2. Polar compounds.
3. Metals.
4. Nonmetals.
5. Positive ion.
6. Negative ion.
7. 🕮 Metalloids.
8. 🕮 Chemical activity series.
9. Basic oxides.
10. Acidic oxides.

9. Write the balanced chemical equations, which express the following reactions :

1. 🕮 Magnesium with dilute hydrochloric acid.
2. Burning a magnesium strip in oxygen.
3. Dissolving of magnesium oxide in water.
4. Burning a piece of coal in air.
5. 🕮 Carbon dioxide with water.

10. Arrange the following elements :

1. $_{11}Na$ / $_{19}K$ / $_{13}Al$ / $_{12}Mg$ (ascendingly according to the atomic size).
2. $_{19}K$ / $_{3}Li$ / $_{55}Cs$ / $_{11}Na$ (ascendingly according to the metallic property).
3. Cu / Zn / Mg / K (ascendingly according to the chemical activity).

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11. How can you differentiate chemically between each of the following ? [Write the chemical equation if it is possible].

1. Sodium and iron [using (H_2O)].
2. Magnesium oxide and sulphur oxide.

12. Choose the odd word (or symbol) out, then write the scientific term of others :

1. Al^{+3} / Na^{+} / Mg^{+2} / Cl^{-} / O^{-2}
2. Silicon / Boron / Arsenic / Bromine.
3. Silver / Sodium / Iron / Calcium.
4. CO_2 / MgO / Na_2O / CaO

13. What happens when ... ?

1. Increasing the atomic number in group (1A) [concerning the atomic size].
2. A metallic atom loses one electron or more during the chemical reaction.
3. A nonmetallic atom gains one electron or more during the chemical reaction.
4. We go from up to down in group (1A).
5. Adding dilute (HCl) to a piece of magnesium.
6. Burning a magnesium strip inside a test tube contains oxygen.
7. Adding some water to magnesium oxide with shaking.
8. Burning a piece of coal inside a test tube contains oxygen.
9. Adding the violet litmus solution to magnesium hydroxide.
10. Adding the violet litmus solution to a jar containing a piece of burning coal.
11. Passing carbon dioxide gas in water.

14. Compare between each of the following :

1. Period elements and group elements.
2. Positive ion and negative ion.
3. Basic oxides and acidic oxides.
4. Metals and nonmetals.
5. Sodium and silver (related to : the reaction with water).
6. Magnesium oxide and carbon dioxide (related to : type of oxide - the reaction with water).

15. Explain the behaviour of the following elements with water :

1. Iron. 2. Silver. 3. Potassium.

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16. Mention the type of mathematical relation (direct or inverse) between each of the following with drawing as possible.

1. The atomic size and atomic number of the elements of the same period.
2. The atomic size and atomic number of the elements of the same group.
3. Metallic property and atomic number of elements of group (1A).
4. Metallic property and atomic size of elements of group (1A).

17. Variant questions :

(1) $2Mg + O_2 \xrightarrow{\Delta} (A)$ $\qquad$ $(A) + H_2O \longrightarrow (B)$

1. Write the name and the chemical formula of (A) and (B).
2. What is the effect of adding litmus solution to the compound (B) ?
3. What is the type of the compound (A) ?

(2) Three elements ($_{11}X$) , ($_{6}Y$) and ($_{12}Z$) , which of these elements :

1. Reacts instantly with water and hydrogen gas evolves which burns with a pop sound ?
2. Reacts very slowly with cold water ?
3. Whose oxide consists of two atoms only ?

(3) Three elements ($_{3}X$) , ($_{9}Y$) and ($_{11}Z$) , which of these elements :

1. Has the smallest atomic size ?
2. Has the strongest metallic property ?

(4) Sodium ($_{11}Na$), aluminium ($_{13}Al$) and carbon ($_{6}C$) are three elements from the periodic table, mention :

1. The period of each of these elements.
2. The number of group of each element.
3. The type of oxide of each element.
4. The type of solution which is formed as a result of adding water to :
   a. Sodium oxide. $\qquad$ b. Carbon dioxide.

(5) If you have the following materials [Water (H_2O) – Magnesium (Mg) – Hydrochloric acid (HCl) – Magnesium oxide (MgO)].

By chemical equations only, show how can you get :

1. An alkaline solution.
2. A metal chloride.

(6) How can you clean the silver tools by a chemical way ?

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18. Study the following figures, then answer the questions :

(1) Look at the following figures, then answer :

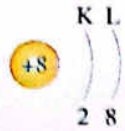


Fig. (A)

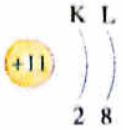


Fig. (B)

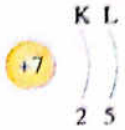


Fig. (C)

Which one of the figures represents ... ?

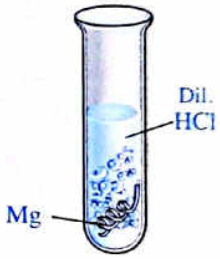
1. A neutral atom. 2. A positive ion. 3. A negative ion.

(2) The opposite figure represents a part of the periodic table. Answer the following :

$_3Li$	$_4Be$	$_5B$	$_6C$	$_7N$	$_8O$
$_{11}Na$					
$_{19}K$					

1. Which element has the greatest atomic size ?
2. Which element has the lowest atomic size ?

(3) On adding a dilute hydrochloric acid to a magnesium ribbon (as shown in the figure), a gas is evolved :



1. Name the gas, how can you identify it?
2. Write the balanced symbolic equation which expresses this reaction.

(4) Which of the following figures represents the graduation of the atomic size property in period (3) ?

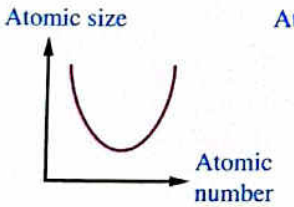


Fig.(A)

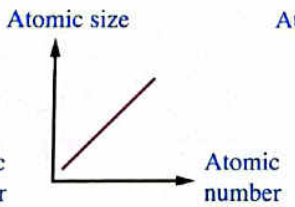


Fig.(B)

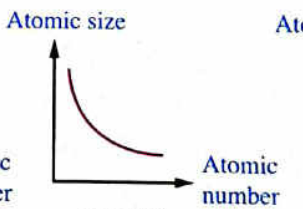


Fig.(C)

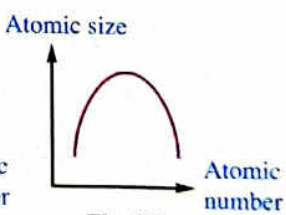


Fig.(D)

Thinking Skills Questions

1. Choose the correct answer :

1. Three elements (X, Y, Z) lie in the same period in the periodic table, if oxide of element (X) reacts with acids and bases, oxide of element (Y) reacts with bases only and oxide of element (Z) reacts with acids only.
What is the correct order of atomic numbers of these elements ?

a. X < Z < Y b. Y < X < Z c. Y < Z < X d. Z < X < Y

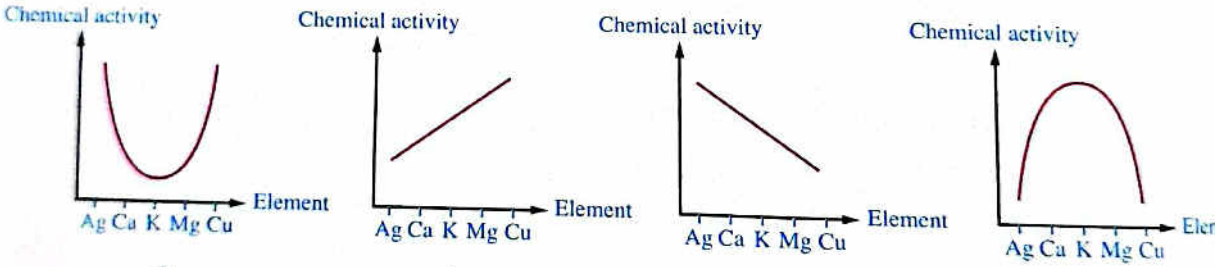
2. The number of electrons present in the ion of trivalent metallic element, whose electrons orbit in three energy levels is .....

a. 3 b. 8 c. 10 d. 13

3. The nucleus of (X^{-2}) ion is surrounded by 18 electrons revolve around it, and the mass number of this ion equals 32, so the number of electrons in the (X) atom is ..... and the number of its neutrons is .....

a. 16 , 23 b. 18 , 23 c. 18 , 32 d. 16 , 16

4. Graph ..... represents the degree of the chemical activity of some elements with wate

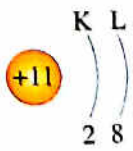


a. b. c. d.

2. Arrange the following elements in a descending order according to their atom size :

($_{14}Si$ / $_{19}K$ / $_{12}Mg$ / $_{9}F$ / $_{20}Ca$ / $_{8}O$).

3. The opposite figure represents the electronic configuration of an ion of an element, mention :



a. The atomic number of the atom of this element and which block does it belong to ?

b. The location of this element in the modern periodic table.

c. The nearest inert gas for this element.

d. The type of oxide of this element.

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4. **A tetravalent nonmetallic element (X), whose electrons orbit in 2 energy levels, when it reacts with oxygen, it forms (XO_2) oxide.**

a. Calculate the atomic number of this element.

b. What is the type of this oxide ? **(Give a reason).**

5. **A metallic element (X) located in the third period of the modern periodic table, when it combines with oxygen, it forms (XO) oxide.**
Answer the following questions :

a. Mention the valency of this element and its atomic number.

b. Mention the type of its oxide and the block which the element belongs to.

c. What happens when we add few drops of litmus solution to this oxide solution ?

6. **A divalent nonmetallic element located in the second period whose nucleus contains 8 neutrons, calculate :**

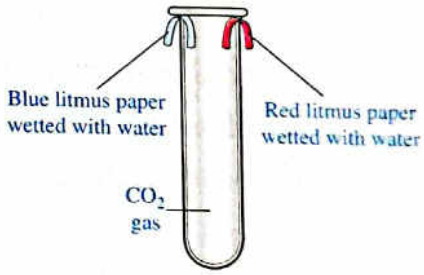
a. Its mass number.

b. Number of electrons located in the outermost energy level of its ion.

7. **In the opposite figure :**

a. What happens in this case for the two different litmus papers ? **(Give a reason).**

b. Write the chemical equation of the reaction.



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LESSON 3

Main Groups in the Modern Periodic Table



What are the properties of some main groups in the modern periodic table ?

Do you know that some of the main groups in the periodic table are characterized by specific names due to their properties such as :

- Alkali metals.
- Halogens.
- Inert gases.

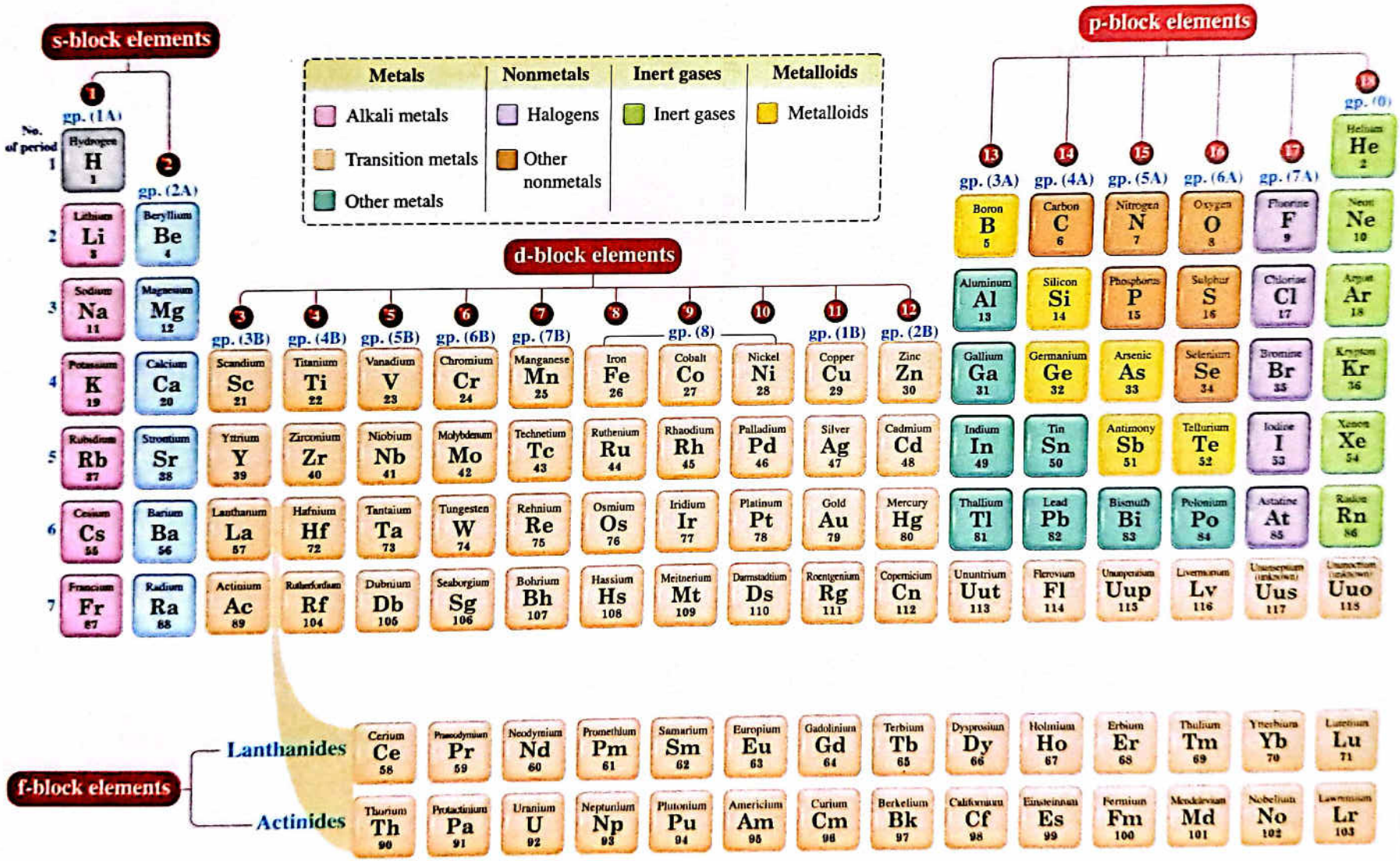


* In this lesson, we are going to study three of the main groups in the modern periodic table, which are :

The name of the group	Alkali metals	Halogens	Inert gases
Traditional number :	I A	7 A	0
Modern number :	1	17	18

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Elements of the Modern Periodic Table

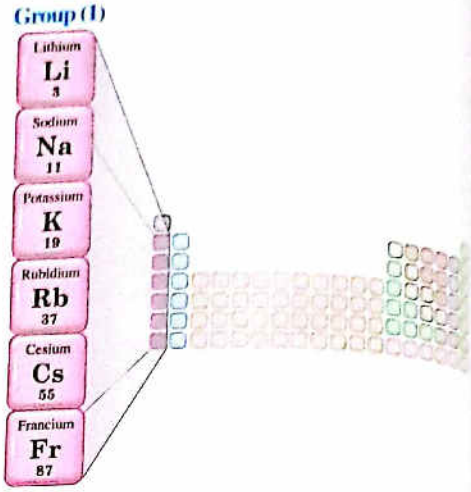


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1 Alkali metals group [group 1A]

❋ Location :

- It is located on the maximum left side of the modern periodic table (as shown in the opposite figure).
- It is the first group of **s-block**.



Alkali metals

▸ Enrichment information

Although hydrogen gas exists in group (1A), it is a nonmetal because its atom is remarkably small and it is a gaseous element.

❋ General properties of alkali metals :

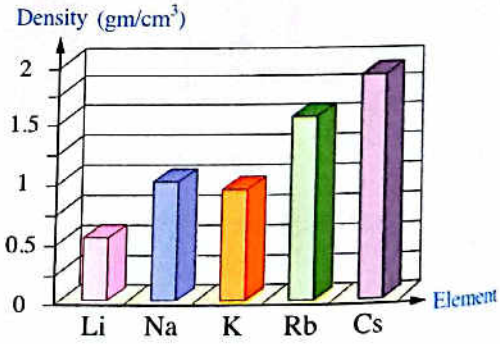
A Physical properties

1. They are **good** conductors of heat and electricity.
2. All of them are **solids** at ordinary temperature and they have **metallic lustre**.
3. Most of them have **low density**.

Exercise

Study the opposite figure which represents the density of alkali metals, then determine :

1. The alkali metal which has the lowest density and which one has the highest density.
2. The elements that float on water and those that sink in water, with explanation.



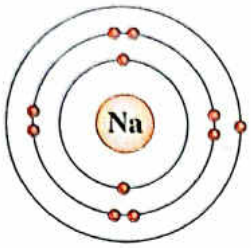
Answer

1. - The **lowest** density alkali metal : Lithium (Li) element.
   - The **highest** density alkali metal : Cesium (Cs) element.
2. - Alkali elements that **float** on water surface : Lithium (Li), Sodium (Na), Potassium (K).
   Explanation : Because their densities are smaller than the density of water (1 gm/cm^3).
   - Alkali elements that **sink** in water : Rubidium (Rb), Cesium (Cs).
   Explanation : Because their densities are greater than the density of water (1 gm/cm^3).

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B Chemical properties

1 Their outermost energy level contains only one electron.



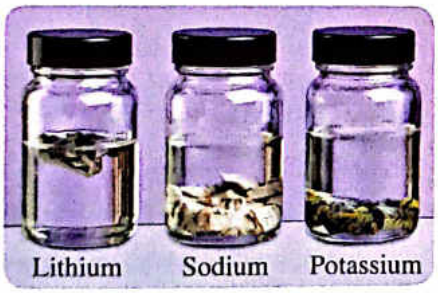
Sodium is monovalent metal

2 **They are monovalent elements** G.R.
Because they tend to lose their valency (outermost) electron during the chemical reaction forming positive ions, each of them carries one positive charge.

$$M \longrightarrow M^{+} + e^{-}$$

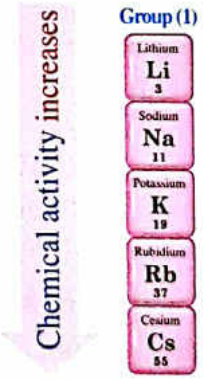
Alkali metal — Positive ion — Electron

3 **They are chemically active elements so, they are kept under the surface of kerosene or paraffin oil** G.R.
to prevent their reactions with moist air.



Alkali metals are kept under the surface of kerosene [except lithium which is kept under the surface of paraffin oil].

4 **Their chemical activity increases as the atomic number increases** G.R.
Due to the increase of their atomic sizes, so they can lose the valency electron easily.



G.R. ***Cesium (Cs) is the most active alkali metal in the periodic table.***
Because it has the largest atomic size, so it can lose its valency electron easily.

Enrichment information

Lithium is not kept under the surface of kerosene, because it floats on its surface and burns at once causing the burning of kerosene too, so it is kept in paraffin oil as lithium sinks in paraffin oil.

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Activity **Reaction of alkali metals with water :**

Substances and tools:

- A very small piece of sodium.
- A very small piece of potassium.
- Two beakers containing water.
- Two filter paper.

Steps :

1. Wrap the two small pieces of sodium (pea size) and potassium with a filter paper.
2. Put each of them carefully in a beaker containing water.

Observations :

- Both sodium and potassium react strongly with water and hydrogen gas evolves which burns with a pop sound (by the effect of the heat produced from the reaction).
- The reaction of potassium with water is stronger than that of sodium.



Reaction of sodium with water



Reaction of potassium with water

Conclusion:

- Each of sodium and potassium reacts with water forming **alkaline solution** and **hydrogen gas** evolves.

$$\underset{\text{Sodium}}{2Na} + \underset{\text{Water}}{2H_2O} \longrightarrow \underset{\text{Sodium hydroxide}}{2NaOH} + \underset{\text{Hydrogen gas}}{H_2\uparrow}$$

$$\underset{\text{Potassium}}{2K} + \underset{\text{Water}}{2H_2O} \longrightarrow \underset{\text{Potassium hydroxide}}{2KOH} + \underset{\text{Hydrogen gas}}{H_2\uparrow}$$

- The reaction of potassium with water is stronger than that of sodium, because potassium is more active than sodium as its atomic size is larger than that of sodium.

G.R.

- ***Elements of group (1A) in the periodic table are called alkali metals (alkaline metals).***

  Because they react with water forming alkaline solutions.

- ***Sodium fires are not put off with water.***

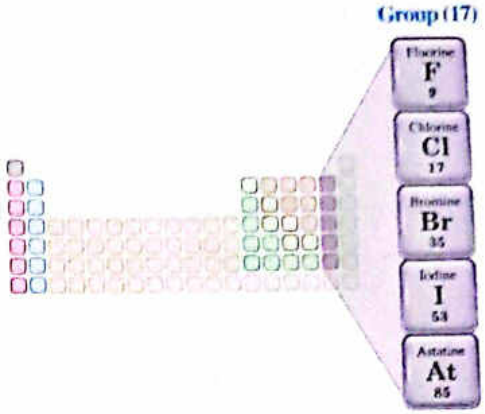
  Because sodium reacts instantly with water and hydrogen gas evolves which burns with a pop sound by the effect of the heat produced from the reaction :

$$2Na + 2H_2O \longrightarrow 2NaOH + H_2\uparrow$$

TRY to answer worksheet 7 in the Notebook

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2 Halogens group [group 7A]



Halogens elements

❋ Location :

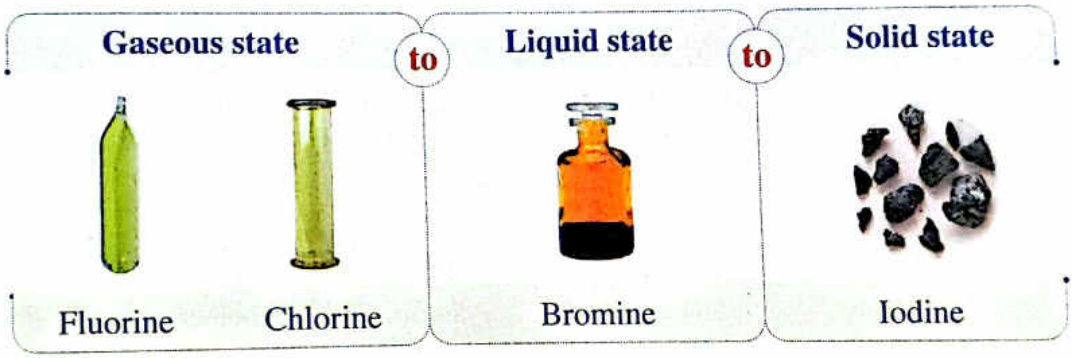
- It is located on the right side of the modern periodic table before the inert gases.
- It is one of the groups of **p-block**.

❋ General properties of halogens :

A Physical properties

1. They are **bad** conductors of heat and electricity.

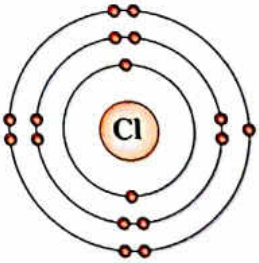
2. Their physical state is graduated from :



B Chemical properties

1. Their outermost energy level contains **7 electrons**.

2. They are monovalent elements G.R.
Because they tend to gain one electron only during the chemical reaction forming negative ions each of them carries one negative charge.



Chlorine is monovalent nonmetal

$$M + e^- \longrightarrow M^-$$

M: Nonmetal "halogen" — e^-: Electron — M^-: Negative ion

3. They are **chemically active** elements, therefore they do **not** exist individually in nature but they exist in **chemical compounds** [except Astatine (At) which is prepared artificially].

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4. They exist in the form of **diatomic** molecules (formed of two atoms).

Element	Fluorine	Chlorine	Bromine	Iodine
Formula of molecule	F_2	Cl_2	Br_2	I_2

5. They react with **metals** forming **salts**, so they are called **halogens**, which mean **"Salts formations"**.

$2K + Br_2 \longrightarrow 2KBr$
Potassium — Bromine — Potassium bromide

$2Na + Cl_2 \longrightarrow 2NaCl$
Sodium — Chlorine — Sodium chloride

6. Each element from halogens **replaces** the elements **below** it in their salt solutions.

Examples :

$Cl_2 + 2KBr \longrightarrow 2KCl + Br_2$
Chlorine — Potassium bromide — Potassium chloride — Bromine

$Cl_2 + 2NaBr \longrightarrow 2NaCl + Br_2$
Chlorine — Sodium bromide — Sodium chloride — Bromine

$Br_2 + 2KI \longrightarrow 2KBr + I_2$
Bromine — Potassium iodide — Potassium bromide — Iodine

For illustration :

Although fluorine is the most active halogen, but it doesn't replace other halogens in their salt solutions because it reacts with water which the salt dissolved in.

▸ Enrichment information

Chlorine is used in the manufacture of corrector, which is a very volatile liquid. On using it, it becomes dry quickly, leaving a white substance on the words and lines required to be deleted.

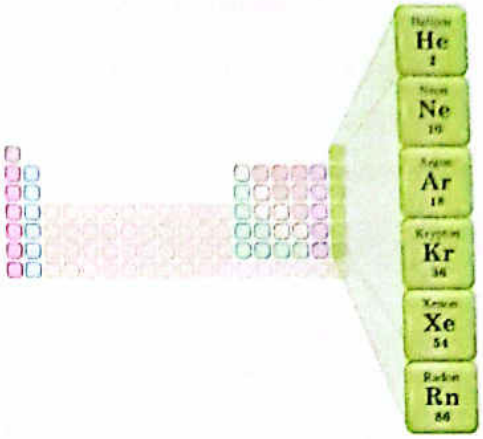


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3 Inert gases group [group 18]

❋ Location :

- It is located on the maximum right side of the modern periodic table.
- It is the last group in **p-block**.



Inert gases

❋ General properties of inert gases :

1. They are present in **gaseous** state.
2. Their outermost energy level contains **8 electrons**, except **Helium** which contains only 2 electrons [Helium has only (K) energy level].
3. **Their valency equals zero** G.R.
   Because their outermost energy levels saturated with electrons.
4. They are **chemically inactive** elements, G.R.
   Because they don't react with other elements under normal conditions.
5. They exist in the form of **monoatomic** molecules (formed of one atom only).

Question

From the following figure which represents a section of the modern periodic table. Answer the following questions :

																N
											I	K		L		
A	B													Q		
		C		D			E		F		G		J			M	

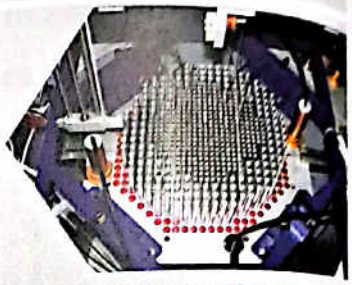
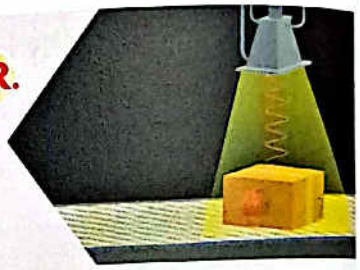
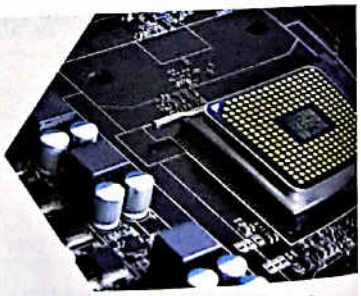
[NB. The letters in the table don't represent the actual symbols of elements]

1. What is the letter which indicates each of the following ? Mention the group number of each of them :
   a. An element is kept under the surface of kerosene in laboratory.
   b. An element doesn't react with another under normal conditions.
2. Does the element (Q) replace the element (L) or the element (M) in its salt solution ?

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Properties of some elements and their uses

- Uses of elements or their compounds in the modern techniques depend on their properties and types.
- The following table shows the uses of some elements.

Element	Its uses
 **Sodium in a liquid state** [Metal]	**It is used in a liquid state in the nuclear reactor G.R.** Because it is a good conductor of heat that can transfer heat from inside the nuclear reactor to outside to be used to obtain the vapour energy required to generate electricity.  Core of nuclear reactor
 **Radioactive cobalt 60** [Transition element] 60 is the mass number of cobalt	**It is used in food preservation G.R.** Because it radiates (emits) gamma rays, which prevent the reproduction of microbial cells without an effect on human.  Sterilization of meat by gamma rays
 **Silicon** [Metalloid]	**Silicon slides are used in the manufacture of electronic devices such as computer and transistor G.R.** Because it is a semi-conductor which its ability to conduct electricity depends on temperature.  Electronic slide
 **Liquefied nitrogen** [Nonmetal]	**It is used in the preservation of cornea of the eye G.R.** Due to the decrease in its boiling point (–196°C).  Liquefied nitrogen

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Comparison between main groups in the modern periodic table :

P.O.C.	Alkali group	Halogens group	Inert gases group
Group number :	(1) 1A	(17) 7A	(18) 0
Block which it belongs to :	s-block	p-block	
Valency of its elements :	Monovalent		Zero

Enrichment information

The Egyptian scientist Dr : Moustafa El-Sayed got the highest American medal in science for his efforts in the Nanotechnology on 29th September, 2008 and applying this technology in using gold in the treatment of cancer disease.



Dr : Moustafa El-Sayed

TRY to answer worksheets 8&9 in the Notebook

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Remember Lesson Three



From the main groups in the modern periodic table :

1. Alkali metals group (group 1A) :

- It is located on the maximum left side of the modern periodic table.

• **Properties of alkali metals :**

- They are good conductors of heat and electricity.
- Most of them have low density.
- All of them are solids at ordinary temperature and they have metallic lustre.
- They are monovalent as they tend to lose their valency electron during the chemical reaction.
- They are chemically active elements.

2. Halogens group (group 7A) :

- It is located on the right side of the modern periodic table before the inert gases.

• **Properties of halogens :**

- They are bad conductors of heat and electricity.
- They are monovalent elements as they tend to gain one electron during the chemical reaction.
- They exist in the form of diatomic molecules.
- They are chemically active elements.

3. Inert gases group (group 0)

- It is located on the maximum right side of the modern periodic table.

• **Properties of inert gases :**

- They are present in gaseous state in the form of monoatomic molecules.
- Their outermost energy level contains 8 electrons, except Helium which contains or 2 electrons.
- Their valency equals zero and they are chemically inactive.

Properties of some elements and their uses :

- Sodium is used in a liquid state in transferring heat from inside the nuclear reactor to outside.
- Cobalt 60 is used in food preservation.
- Silicon slides are used in the manufacture of electronic devices.
- Liquefied nitrogen is used in the preservation of cornea of the eye.

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Questions ? on lesson Three

Interactive Exercises

• Remember • Understand • Apply • Higher skills 🕮 School book questions.

1. Choose the correct answer :

1. Alkali metals locate in group .....
   a. 7A b. 1A c. 1B d. 2A
2. Alkali metals are considered from .....block groups.
   a. s b. p c. d d. f
3. Which of the following elements is an alkali metal which locates in period three ? .....
   a. $_3Li$ b. $_{12}Mg$ c. $_{11}Na$ d. $_{19}K$
4. Elements of group (1A) react with water forming ..... solutions.
   a. acidic b. alkaline c. neutral d. (a) and (c)
5. Hydrogen element belongs to .....
   a. group (1A). b. group (2A). c. group (6A). d. group (7A).
6. All these elements are monovalent except .....
   a. $_{11}Na$ b. $_{19}K$ c. $_{20}Ca$ d. $_3Li$
7. Sodium and potassium are kept under the surface of .....
   a. water. b. kerosene. c. alcohol. d. benzene.
8. The gas evolved on reacting alkali metal with water is .....
   a. oxygen. b. nitrogen. c. hydrogen. d. helium.
9. Most alkali metals have ..... density.
   a. low b. high c. the same d. zero
10. All these alkali metals float on water surface except .....
    a. potassium. b. lithium. c. sodium. d. cesium.
11. ..... form positive ions during chemical reactions.
    a. Nobel gases b. Nonmetals c. Halogens d. Alkali metals
12. All of the following are from the properties of alkali metals, except they .....
    a. have low densities. b. are divalent elements.
    c. conduct heat and electricity. d. are active elements.
13. Which of the following elements has the highest chemical activity ? .....
    a. Sodium. b. Lithium. c. Potassium. d. Cesium.
14. 🕮 The strongest metal lies in group .....
    a. 7A b. 1B c. 1A d. 2A
15. Elements of group (7A) are known as .....
    a. inert gases. b. alkali metals. c. halogens. d. metalloids.

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16. The outermost energy level of any halogen contains ..... electrons.
a. 2 b. 7 c. 8 d. 9

17. ..... is considered from halogens.
a. Sodium b. Chlorine c. Helium d. Calcium

18. Halogens are considered from .....block groups.
a. s b. p c. d d. f

19. All these halogens exist in a gaseous state except .....
a. fluorine. b. chlorine. c. iodine. d. (a) and (b).

20. The halogen which exists in a liquid state is .....
a. bromine. b. chlorine. c. fluorine. d. iodine.

21. The molecule of halogen is composed of ..... atom(s).
a. one b. two c. three d. four

22. ..... in its salt solutions.
a. Chlorine replaces bromine b. Bromine replaces fluorine
c. Iodine replaces chlorine d. Iodine replaces fluorine

23. The element(s) which can't replace bromine in its salt solution is (are) .....
a. fluorine. b. iodine. c. chlorine. d. (a) and (c).

24. The halogen, which can be prepared artificially is .....
a. chlorine. b. astatine. c. iodine. d. bromine.

25. Bromine can't be obtained when chlorine reacts with ..... solution.
a. sodium bromide b. potassium bromide c. sodium iodide d. (a) or (b)

26. Sodium in a liquid state is used in .....
a. nuclear reactors. b. computers. c. fridges. d. sterilization.

27. The element which is used in the manufacture of transistor is .....
a. S b. Si c. Na d. K

28. The element that emits gamma rays is .....
a. ^{60}Co b. ^{23}Na c. ^{14}N d. ^{35}Cl

29. ..... rays are used in preservation of food.
a. Beta b. Alpha c. Gamma d. Laser

30. Cornea is preserved by using .....
a. nitrogen gas. b. liquid paraffin.
c. liquefied nitrogen. d. helium gas.

31. The boiling point of liquefied nitrogen is .....
a. 0°C b. 196°C c. 100°C d. – 196°C

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2. Put (✓) or (✗) and correct what is wrong :

1. During chemical reactions, alkali metals form positive ions which carry two positive charges. ( )
2. Magnesium and potassium are kept under the surface of kerosene. ( )
3. Lithium is the most active metal in group (1A). ( )
4. Hydrogen gas evolves when sodium reacts with water. ( )
5. Potassium is more active than sodium in group (1A). ( )
6. The chemical activity of group (1A) elements increases as the atomic size increases. ( )
7. Alkali metals of group (1A) are good conductors of heat and electricity. ( )
8. Alkali metals are monovalent elements. ( )
9. Bromine exists in a liquid state, while iodine exists in a gaseous state. ( )
10. Chlorine can replace bromine in its salt solution. ( )
11. Potassium bromide is formed by the reaction of bromine with potassium chloride. ( )
12. Elements of group (18) are known as halogens. ( )
13. Halogens group is from s-block groups. ( )
14. Liquefied nitrogen is used in food preservation. ( )
15. Cobalt 60 emits gamma rays. ( )
16. Sodium is used in the preservation of cornea of the eye. ( )
17. Magnesium slides are used in the manufacture of electronic devices. ( )

3. Write the scientific term of each of the following :

1. • The group which is located on the maximum left side of the periodic table.
   • The first group of s-block groups in the periodic table.
2. • Elements of group (1A) in the modern periodic table.
   • Monovalent elements exist in s-block in the modern periodic table.
3. The kind of ions which are formed by alkali metals during chemical reactions.
4. The most active metal in the periodic table.
5. The group which is located on the right side of the periodic table before group zero.
6. • Elements of group (7A) in the periodic table.
   • Monovalent elements exist in p-block in the periodic table.
7. The halogen which exists in a solid state.
8. The halogen which exists in a liquid state.
9. The metal which is used in a liquid state in transferring heat from inside the nuclear reactor to outside.
10. The radioactive element, which is used in food preservation.
11. The metalloid which is used in the manufacture of electronic devices.
12. The nonmetal which is used in preservation of cornea of the eye.

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4. Complete the following statements :

1. Elements of group (1A) are named as ..... and they are among .....block element
2. Alkali metals group is located on ..... of the modern periodic table.
3. ..... and ..... elements are among alkali metals.
4. Elements of group (1A) are called alkali metals as their elements react with ..... forming ..... solutions.
5. The valency of alkali metal elements is .....
6. During chemical reaction, an alkali metal loses its ..... electron and changes into ..... ion which carries ..... positive charge.
7. Alkali metals are ..... metals therefore, they are kept under the surface of ..... or .....
8. Sodium is kept under the surface of ..... to prevent it from the reaction with .....
9. The chemical activity of alkali metals increases as the ..... and ..... increase.
10. ..... is the most active metal as it has the largest .....
11. ..... is the alkali metal element, which is located in period three of the periodic table.
12. All alkali metals are good conductors of ..... and .....
13. Lithium and sodium ..... on the surface of water as their densities are ..... than water density.
14. Rubidium and cesium ..... in water as their densities are ..... than water density.
15. Sodium reacts with water giving ..... and ..... gas evolves.
16. The reaction of potassium with water is ..... than the reaction of sodium with water as potassium is ..... active than sodium.
17. Elements of group (7A) are called .....
18. Halogens are among ..... block groups and they are located on the ..... side of the periodic table before ..... gases.
19. The valency of the elements of group (7A) is ..... , as they tend to ..... one electron during the chemical reaction and change into ..... ions.
20. The outermost energy level (valency shell) of alkali metals contains ..... electron(s), while that of halogens contains ..... electron(s).
21. Fluorine and chlorine exist in a ..... state, while iodine exists in a ..... state.
22. Halogen molecules are ..... molecules as their molecules consist of ..... atoms.
23. Chlorine can replace ..... and ..... in their salt solutions.
24. Bromine reacts with potassium iodide giving ..... and.....
25. ..... is used in food preservation, because it emits ..... rays which prevent reproduction of microbial cells.

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5. Complete the following chemical equations :

1. $2Na + \ldots\ldots \longrightarrow 2NaOH + H_2\uparrow$
2. $2K + 2H_2O \longrightarrow \ldots\ldots + \ldots\ldots$
3. $\ldots\ldots + Br_2 \longrightarrow 2KBr$
4. $2Na + Cl_2 \longrightarrow \ldots\ldots$
5. $2NaBr + Cl_2 \longrightarrow \ldots\ldots + \ldots\ldots$
6. $Br_2 + \ldots\ldots \longrightarrow 2KBr + I_2$
7. $Cl_2 + 2KBr \longrightarrow \ldots\ldots + \ldots\ldots$

6. Complete the following table :

Element	Symbol	Type	Use
1.	N	.....	Its liquid state is used in preservation of cornea of the eye.
2. Silicon	.....	.....	.....
3.	Co	.....	.....
4. Sodium	.....	.....	.....

7. Give a reason for each of the following :

1. Elements of group (1A) are known as alkali metals.
2. Sodium is kept under the surface of kerosene.
3. Lithium is the lowest active metal in group (1A).
4. Lithium floats on water surface, while cesium sinks in it.
5. The reaction of potassium with water is more strongly than the reaction of sodium with water.
6. Sodium fires aren't put off with water.
7. Cesium is the most active alkali metal in the periodic table.
8. Alkali metals are monovalent elements.
9. Elements of group (7A) are known as halogens.
10. Halogens do not exist in nature in an individual state.
11. Bromine can't replace chlorine in its salt solution.
12. Both alkali metals and halogens are monovalent elements.
13. The liquid sodium is used in nuclear reactors.
14. The use of radioactive cobalt 60 in food preservation.

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15. Silicon slides are used in the manufacture of electronic devices.
16. Liquefied nitrogen is used in the preservation of cornea of the eye.

8. Write the balanced chemical equations that illustrate the following reaction

1. Reaction of sodium with water.
2. Reaction of potassium with water.
3. Reaction of sodium with chlorine.
4. Reaction of potassium with bromine.
5. Effect of bromine on sodium iodide solution.
6. Reaction of chlorine gas with potassium bromide solution.
7. Passing chlorine gas in potassium iodide solution.
8. Reaction of chlorine with sodium bromide solution.

9. Mention one use of each of the following elements in modern technique

1. Liquid sodium.
2. Cobalt 60
3. Liquefied nitrogen.
4. Silicon.

10. Choose the odd word (or symbol) and write the scientific term of the rest :

1. Lithium / Sodium / Potassium / Helium.
2. Cl_2 / Br_2 / O_2 / I_2
3. Helium / Neon / Chlorine / Argon.

11. Compare between :

1. Alkali metals group and halogens group.
2. Chlorine and bromine [according to : the physical state and chemical activity].
3. Fluorine and helium.

12. Variant questions :

(1) Arrange the following elements :

1. Ascendingly according to the degree of chemical activity :
   Sodium / Rubidium / Lithium / Cesium
2. Ascendingly according to the density :
   Na / K / Li / Rb / Cs

(2) How can you use water to obtain a gas burns with a pop sound ?
Explain your answer with a balanced chemical equation.

(3) Mention the general properties of alkali metals.

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(4) What is meant by ... ?

1. Alkali metals. 2. Halogens.

(5) You have three elements X , Y and Z, their atomic numbers are 10, 17 and 3 respectively.

Which of these elements belongs to :

1. Inert gases group. 2. Alkali metals group. 3. Halogens group.

(6) Which of the following three elements : $(_{11}X), (_{17}Y), (_{14}Z)$.

1. Can replace iodine in potassium iodide solution.
2. Reacts with water strongly with releasing heat.
3. Enters in formation of a compound which its solution turns violet litmus solution into blue.
4. Enters in the manufacture of electronic slides.
5. Form a salt when reacting together. **(Choose two elements).**

(7) 🕮 The following table shows the properties of three elements (X , Y and Z)

Element symbol	Behaviour with water	Physical state	Electric conductivity	Density (gm/cm^3)
X	dissolve	gas	bad conductor	0.003
Y	react	solid	good conductor	3.59
Z	react instantly	solid	good conductor	0.86

[NB : The letters in the table don't represent the actual symbols of elements]

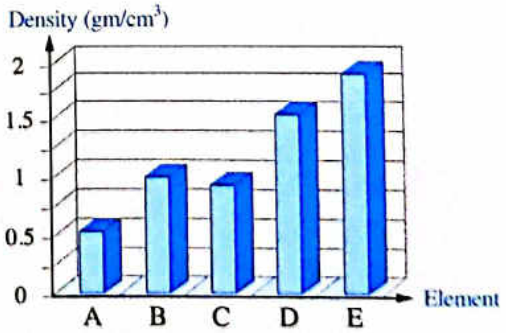
Mention the symbol, which represents an element from :

1. Alkali metals. 2. Halogens.

13. Study the following figures, then answer the questions :

(1) The opposite figure represents the density of elements of one of the two groups of s-block :

1. What is the name and the group number represented by the figure ?
2. What is the name and the symbol of each of the two elements A & D ?
   Which of them sinks in water ?
   Giving reason.



[NB. The letters in the graph don't represent the actual symbols of elements]

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(2) The opposite figure represents one of the groups of the modern periodic table :

1. What is the name of this group ?
   What is the valency of their elements ?
2. What is the importance of element (Y) in the nuclear reactor ?
3. Calculate the atomic number of element (Z).
4. **Mention the symbol which indicates :**
   (a) The element which has the smallest atomic size.
   (b) The most chemically active element.

X
Y
Z
L
M

[NB. The letters in the table don't represent the actual symbols of elements]

(3) The opposite figure represents the reaction of a piece of sodium with water :



1. What is the name of the evolved gas ?
2. What is the type of the formed solution?
   What is its effect on violet litmus solution ?
3. Write the balanced chemical equation of this reaction.

(4) The opposite figure shows the reaction of element (X) that lies at the beginning of period (4) in the modern periodic table with water :



1. What is the name of element (X) ?
2. What is the name of the produced solution from the reaction ?
3. What is the reason for the presence of element (X) above the water surface ?
4. What happens when replacing element (X) with another (Y) which follows it in the same group ?
5. Describe what happens to the element (X) if water is replaced with kerosene ?

(5) Study the following figure which represents a section of the periodic table, then answer the following :

A																	N
	C												I	K		L	
												H					O
B				D			E		F		G		J			M	

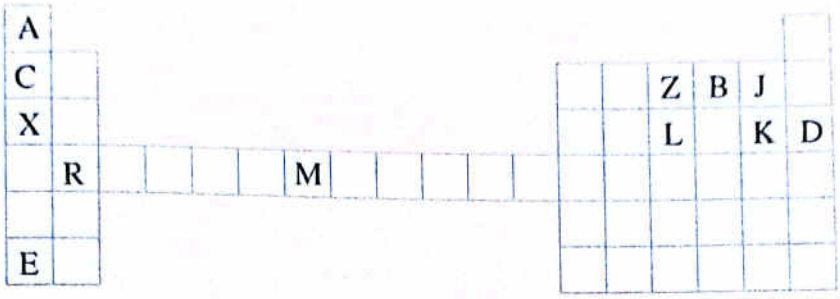
[NB. The letters in the table don't represent the actual symbols of elements]

What is the symbol(s) which indicates the ..... ?

(a) Inert gases.
(b) Alkali metals.
(c) Halogens.
(d) The higher active metal.
(e) The higher active nonmetal.

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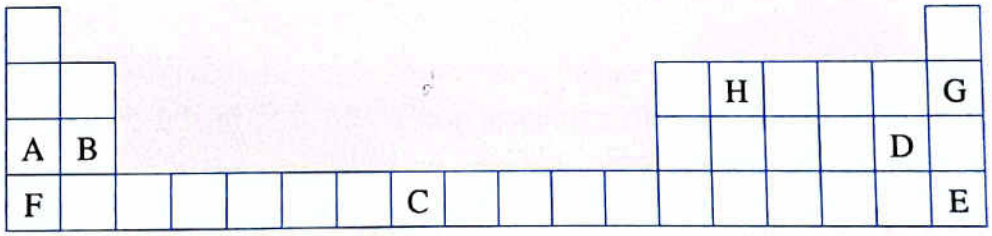
(6) Study the following figure, which represents a part of the modern periodic table, then answer the following :



[NB. The letters in the table don't represent the actual symbols of elements]

1. What are the kinds of elements (X) , (M) and (D) ?
2. Mention the atomic number of the element (B)
3. Mention the symbol, which represents :
   (a) The most active element in group (1A) and mention the name of this group.
   (b) The element which has the largest atomic size in period (2).

(7) Some elements in the periodic table are represented by the letters from A to H and are included in the simplified table as shown below :



[NB. The letters in the table don't represent the actual symbols of elements]

1. Choose the letter(s), which indicates :
   (a) A halogen. (b) The higher active metal.
2. Write the chemical equation, which represents the reaction of water with element "A".
3. **Complete:**
   (a) The molecule of element (D) consists of .....
   (b) The valency of element (F) is ..... and that of element D is .....
4. What is the type of the oxide of element (A) ?
5. Why does not element (D) exist in a single state in nature ? And what is its physical state in normal temperature ?

14. Creative thinking :

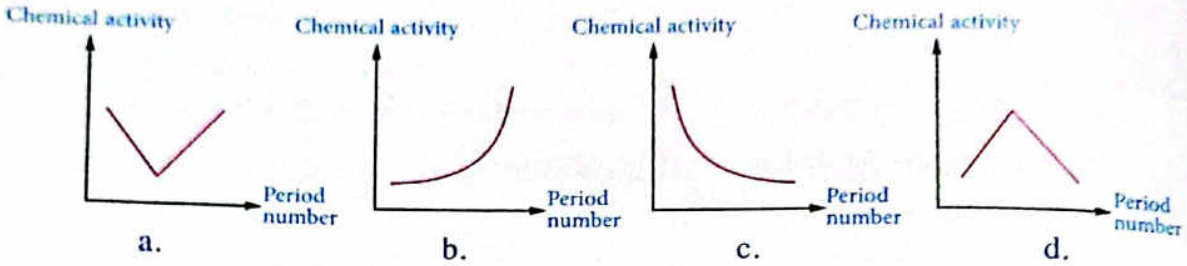
Why lithium is not kept under kerosene but it is kept under paraffin oil ?

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Thinking Skills Questions

1. Choose the correct answer :

1. Graph ..... represents the relation between the degree of chemical activity of alkali metals and the period number for each element :



a. b. c. d.

2. Element (X) is from alkali metals, reacts with element (R) which belongs to group (15) to form a compound, whose chemical formula is .....

a. RX_2 b. X_3R c. RX d. RX_3

3. Element (X) is from alkali metals, reacts with element (Y) from group (17), a salt is produced, whose chemical formula is .....

a. XY_2 b. X_2Y c. XY d. X_2Y_3

2. Element (X) is located in the third period and belongs to alkali metals, while element (Y) is located in halogens group and also in the third period. Answer the following questions :

a. What is the atomic number of (X) and (Y) ? What is the block of each element ?

b. What is the type of the compound resulted from their combination ? (Mention its formula).

c. Could the element (X) combins with another element which belongs to its group ? (Give a reason for your answer).

3. A metallic element (M) is located in the third period in the modern periodic table, reacts with water forming a compound, its formula is (MOH) with evolving a colourless gas. Determine :

a. The valency of element (M).

b. The atomic number of element (M).

c. The block which element (M) belongs to.

d. The name of the produced gas.

e. The type of oxide of element (M).

4. Do you tend to believe these information ? [Giving reasons] :

1. The properties of sodium element are completely different from those of potassium element.

2. Fluorine forms an ion carries one positive charge in one of its compounds.

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LESSON 4

Water



What are the properties of water ?

You have known from the previous studies that water is very important for survival of all living organisms and it has several uses in :

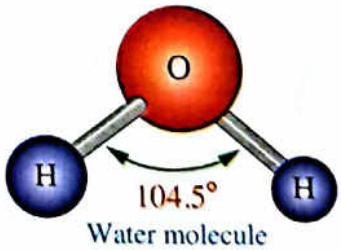
- Agricultural fields.
- Industrial fields.
- Personal fields.



Structure of water

Formation of polar water molecule

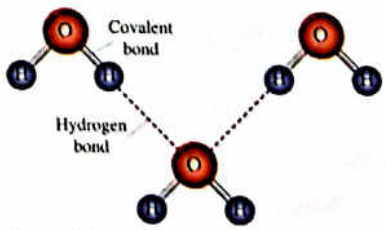
* Water molecule is formed of ***one oxygen*** atom (O) with ***two hydrogen*** atoms (2H) joined together by ***two single covalent bonds***, the angle between them is ***104.5°***



Water molecule

Bonds between water molecules

* **Between polar water molecules originate a type of weak electrostatic attraction known as hydrogen bond** G.R.
  Due to the higher electronegativity of oxygen compared with that of hydrogen.



Hydrogen bonds between water molecules

Hydrogen bond:

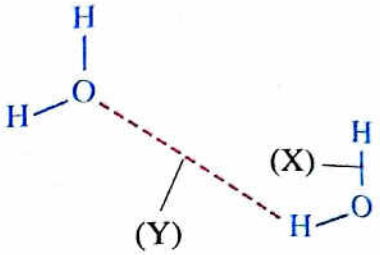
It is a type of weak electrostatic attraction that originates between the molecules of some polar compounds.

* Hydrogen bonds between water molecules are weaker than covalent bonds between the atoms in the same molecules. However hydrogen bonds are considered to be the most important factors which are **responsible for the abnormality of water properties.**

Question

From the opposite figure :

1. What is the type of the two bonds (X) and (Y) ?
2. Which one of them is stronger ?



Properties of water

Some properties of water

A Physical properties

1. It exists in three states
2. It is a good polar solvent
3. Rising of its boiling & its freezing points
4. Its density decreases on freezing

B Chemical properties

1. It has a neutral effect on both of litmus paper
2. Electrolysis of water

A Physical properties of water

1 Water exists in three states

* Water is an unique matter due to its existence in the three states at the ordinary temperature which are :

- Solid state → Ice
- Liquid state → Water
- Gaseous state → Water vapour



Three states of water

2 Water is a good polar solvent

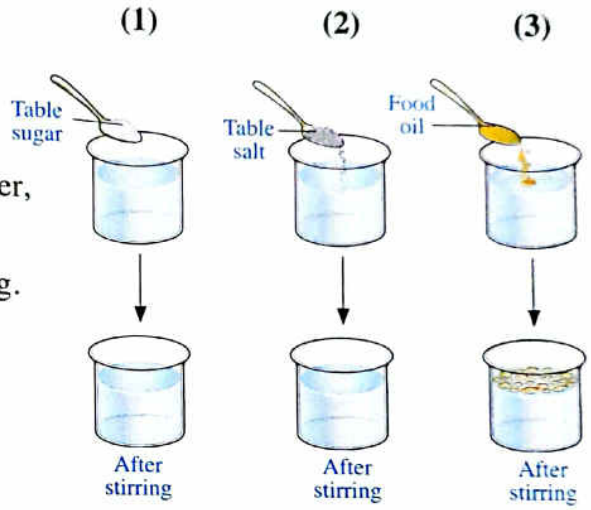
Activity 1 **To prove that water is a good polar solvent :**

Substances and tools:

- Three beakers.
- Table sugar.
- Stirring spoon.
- Table salt.
- Water.
- Food oil.

Steps :

1. Fill the three beakers with an equal amounts of water.
2. Put a spoon of table sugar in the first beaker, a spoon of table salt in the second and a spoon of food oil in the third with stirring.



Observation :

Both sugar and table salt dissolve in water, while oil doesn't dissolve.

Conclusion:

- **Water is a good polar solvent for :**
  1. Most ionic compounds (such as sodium chloride [table salt]).
  2. Some covalent compounds (such as sugar), which can form hydrogen bonds with water.
- **Most covalent compounds as oil cannot dissolve in water, as it cannot form hydrogen bonds with water.**

G.R.

- ***Dissolving of table salt in water.***
  Because water is a good polar solvent for most ionic compounds (as table salt).
- ***Dissolving of sugar in water although it is among covalent compounds.***
  Because sugar molecules can form hydrogen bonds with water molecules.
- ***Oil doesn't dissolve in water.***
  Because it is a covalent compound which cannot form hydrogen bonds with water.

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3 Rising of water boiling point and its freezing point

It was supposed that :

The boiling point of water is less than (100°C).	The freezing point of water is less than (0°C).

But in the normal atmospheric pressure :

Pure water boils at 100°C G.R.	Pure water freezes at 0°C G.R.

This is due to the presence of hydrogen bonds between its molecules.

4 Water density decreases on freezing

* **Water is not like other matters, where its density in solid state (ice) is lower than its density in liquid state (water) G.R.**

Because when the temperature of water becomes less than 4°C, water molecules are collected together by hydrogen bonds forming large-sized hexagonal ice crystals with many spaces between them, so its volume increases and thus its density decreases.



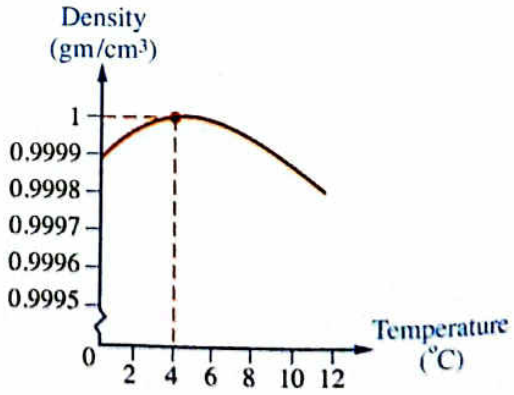
A hexagonal ice crystal

G.R. ***Ice floats on the water surface.***

Because the density of ice is less than the density of water.

➲ **The opposite figure shows the change of water density by changing its temperature, where :**

- The highest value of density of pure water equals 1 gm/cm^3 at 4°C.
- The lowest value of density of pure water at 0°C.



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G.R. • ***Although water of oceans freezes at polar zones, the aquatic creatures are still alive.***

Due to formation of a layer of ice on the surface of liquid water protects the deep water from freezing which preserves the life of the marine organisms in it.



• ***On putting a glass bottle completely filled with water in a freezer, it breaks (explodes).***

Because when water freezes, its volume increases.



Enrichment information

The density of salty water is larger than that of fresh water, so swimming in the sea is more easier than swimming in swimming pools.

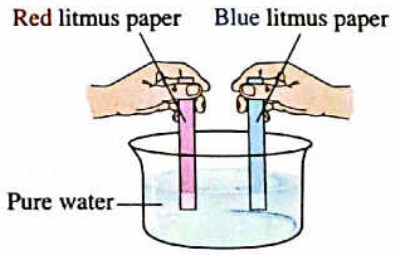
Life application *Dissolving the ice of the freezer quickly :*

- It is possible to dissolve the ice of the freezer quickly after disconnecting the electric current from the fridge :
  - Putting a hot water container in the freezer and close the fridge.
  - Using a hair dryer to direct a hot air current to the formed ice.

B Chemical properties of water

1 Water has a neutral effect on both of litmus paper

Activity (2) Water has a neutral effect on both of litmus paper :

Step	Illustrating figure	Observation
Put two litmus paper (blue and red) in a basin containing pure water.		The colour of the two paper (blue and red) doesn't change.

Conclusion:

The pure water has a neutral effect on both of litmus paper (blue and red).

G.R. ***Pure water doesn't affect blue and red litmus paper.***

Because pure water has a neutral effect on both of litmus paper.

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2 Electrolysis of water

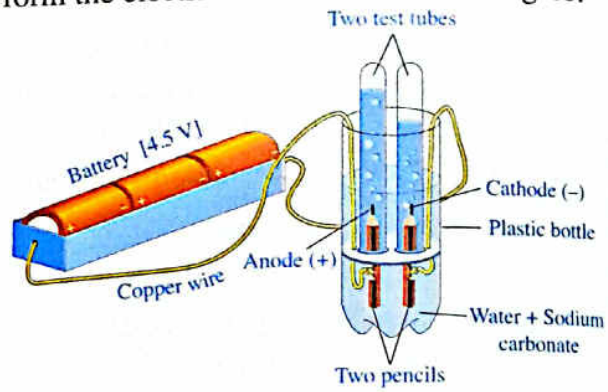
Activity 3 Electrolysis of water :

Substances and tools:

- An empty plastic soda bottle.
- A round piece of foam plate.
- Battery 4.5 volt.
- A spoon of sodium carbonate.
- Two pencils.
- Two test tubes.
- Water.
- Wax gun.
- Two copper wires.

Steps :

1. Use the previous substances and tools to form the electric circuit shown in the figure.
2. Close the circuit for 10 min.
3. Compare between the volume of the evolved gas above the negative pole (cathode) and the volume of the evolved gas above the positive pole (anode).
4. Approach a glowing splint to the gas formed at both cathode and anode.



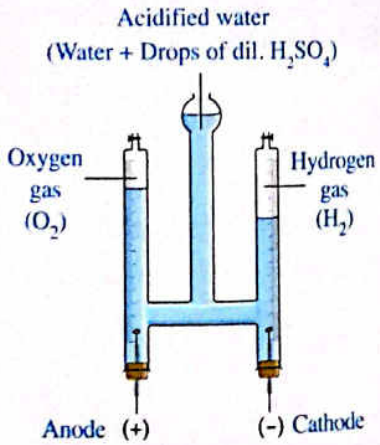
Observations :

1. The volume of the evolved gas above the cathode is twice the volume of the evolved gas above the anode.
2. The evolved gas above the cathode burns with a pop sound, while the evolved gas above the anode makes the glowing splint more glowing.

Conclusion:

- **Hydrogen gas** evolves at the **cathode**.
- **Oxygen gas** evolves at the **anode**.
- The acidified water decomposes by electricity into its two elements (hydrogen and oxygen), the volume of hydrogen gas is twice the volume of oxygen gas at a ratio 2 : 1 by volume respectively.

$$\underset{\text{Water}}{2H_2O} \xrightarrow{\text{Electrolysis}} \underset{\text{Hydrogen}}{2H_2\uparrow} + \underset{\text{Oxygen}}{O_2\uparrow}$$



"Hofmann's Voltameter"

* **The previous activity shows** :

*The idea of work of **Hofmann's Voltameter** which is used for the electrolysis of acidified water as shown in the previous figure.*

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- **The relation between the volume of hydrogen gas and oxygen gas on electrolysis of water :**

Volume of hydrogen gas (at cathode) = 2 × Volume of oxygen gas (at anode)



G.R.

- ***Adding few drops of dilute sulphuric acid (or sodium carbonate) to pure water during its electrolysis by Hofmann's voltameter.***

To make water conduct electricity, where the pure water is a bad conductor of electricity.

- ***The glowing of splint increases by approaching it to the anode of Hofmann's voltameter during electrolysis of acidified water.***

Because oxygen gas evolves at the anode that increases the glowing of splint.

Exercise

On the electrolysis of a certain volume of acidified water by dilute sulphuric acid, the volume of evolved oxygen gas was 2 cm^3. What is the volume of evolved hydrogen gas ?

Answer

∵ The volume of hydrogen gas = 2 × Volume of oxygen gas.

∴ The volume of hydrogen gas = 2 × 2 = 4 cm^3.

Question

- ***Complete :***

1. Ice crystals have ..... shape and large .....
2. Water has a ..... effect on both of litmus paper.

- ***Problem :***

On the electrolysis of a certain volume of water, the volume of the gas which burns with a pop sound on approaching a glowing splint to it is 6 cm^3. What is the volume of the other gas produced from the electrolysis ?

TRY to answer worksheet 10 in the Notebook

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Water pollution

- The continuous increase in agricultural, industrial and developmental activities leads to water pollution.
- Water pollution can be defined as follows :



Water pollution :

It is the addition of any substance to the water which causes **continuous gradual change in water properties** affecting the health and the life of living creatures.

Water pollutants and their harms

• Environmental pollutants are divided generally into two kinds, which are :

	1 Natural pollutants	2 Artificial pollutants
Sources	Natural phenomena.	Different human activities.
Examples	• Lightning accompanied by thunder storms. • Death of living organisms. • Volcanic eruptions.	• The overuse of chemical insecticides and fertilizers. • Throwing sewage, factories wastes and leakage of petroleum oil in the seas and rivers. • Burning coal and oil, which leads to the formation of acidic rains and smog.





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Types of water pollution

- Water pollution is classified into 4 main types as shown in the following table :

Types of water pollution	Causes (Origins)	Harms (Damages)
① **Biological pollution**	Mixing animals and human wastes with water.  Water pollution with animals' wastes	The infection with many diseases such as : **Bilharzia, typhoid and hepatitis.**
② **Chemical pollution**	Discharging factories wastes and sewage in seas, rivers and canals.  Discharging sewage in canals	The increase in some elements concentration causing great harms as : 1. **The death of brain cells :** When eating continuously fish whose bodies contain high concentration of **lead**. 2. **Blindness :** When drinking continuously water containing high concentration of **mercury**. 3. Increases the infection rates of **liver cancer :** When drinking continuously water containing **arsenic**.
③ **Thermal pollution**	Rising of temperature of some marine zones which use water for cooling the nuclear reactors.  Nuclear reactor	Destroy the marine creatures found in these zones due to the separation of the dissolved oxygen in water.  Destroy the marine creatures
④ **Radiant pollution**	- Dumping the atomic wastes in oceans and seas. - Leakage of radioactive materials from nuclear reactors.	**For illustration** *- Increases the infection rates of cancer.*

Note

The nuclear reactors cause both thermal water pollution and radiant water pollution.

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Protection of water from pollution

- **There are many behaviours that must be taken in consideration to protect water from pollution in Egypt, such as :**

1. Prevention of getting rid of sewage, wastes of factories and dead animals in rivers or canals.



2. Disinfection of the drinking water tanks which are found on the roofs of buildings in a periodical manner.



3. **Don't store the tap water in empty plastic bottles** G.R. Because plastic reacts with **chlorine gas** (which is used as water disinfectant) leading to the increase in the infection rates of **cancer**.



4. Spreading environmental awareness among people to protect water from pollution.



5. Developing the stations of water purification and doing a periodical analysis to determine the rate of water validity for drinking.



TRY to answer worksheet 11
- General Exercise of the School Book on Unit 1
- Model exams on Unit 1

in the Notebook

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Remember Lesson Four



- Water molecule is formed of one oxygen atom (O) with two hydrogen atoms (2H) joined together by two single covalent bonds.
- **Hydrogen bond :** It is a type of weak electrostatic attraction that arises between the molecules of some polar compounds.
- **Physical properties of water :**
  - Water exists in three states which are solid, liquid and gaseous.
  - Water is a good polar solvent.
  - Pure water in the normal atmospheric pressure boils at (100°C) and freezes at (0°C).
  - Density of water in solid state (ice) is lower than its density in liquid state (water).
- **Chemical properties of water :**
  - It has a neutral effect on both of litmus paper.
  - It can be decomposed electrically.
  - Hofmann's voltameter is used for the electrolysis of acidified water as shown in the following equation :

$$2H_2O \xrightarrow{\text{Electrolysis}} 2H_2\uparrow + O_2\uparrow$$

- **Water pollution :**

It is the addition of any substance to the water, which causes continuous gradual change in water properties affecting the health and the life of living creatures.

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Questions ? on lesson four

Interactive Exercises

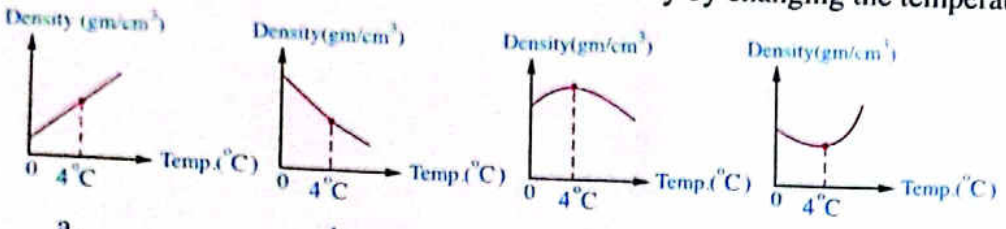
● Remember ● Understand ● Apply ● Higher skills 📖 School book questions.

1. Choose the correct answer :

1. Water molecule is composed of .....
   a. one oxygen atom and one hydrogen atom.
   b. two oxygen atoms and one hydrogen atom.
   c. one oxygen atom and two hydrogen atoms.
   d. two oxygen atoms and two hydrogen atoms.
2. In a water molecule, oxygen atom combines with two hydrogen atoms by two ..... bonds.
   a. double covalent b. ionic
   c. single covalent d. hydrogen
3. In a water molecule, the angle between the two single covalent bonds is .....
   a. 64° b. 104° c. 104.5° d. 140.5°
4. 📖 There are ..... bonds among water molecules.
   a. hydrogen b. covalent c. ionic d. metallic
5. Water exists in the ..... at ordinary temperature.
   a. solid state only b. liquid state only
   c. gaseous state only d. three states
6. All of the following are from substances that dissolve in water except .....
   a. magnesium oxide. b. food oil. c. sodium chloride. d. sugar.
7. The high boiling point of water is due to the presence of ..... bonds between its molecules.
   a. single covalent b. double covalent c. hydrogen d. ionic
8. The snow crystal has ..... shape.
   a. octagonal b. quadrilateral c. pentagonal d. hexagonal
9. Ice crystals are characterized by all the following except they have .....
   a. lower density than that of liquid water. b. large volume.
   c. hexagonal shape. d. higher density than that of liquid water.
10. The density of water in a solid state is .....
    a. less than its density in liquid state. b. equal to its density in liquid state.
    c. greater than its density in liquid state. d. half of its density in liquid state.
11. The pure water boils at ..... °C
    a. 0 b. 4 c. 90 d. 100

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12. The figure ..... represents the change in water density by changing the temperature.



a. b. c. d.

13. Water has a/an ..... effect on both of litmus paper.
a. basic b. acidic c. neutral d. alkaline

14. All of the following are among the properties of water except .....
a. it has a neutral effect on both of litmus paper.
b. it is a polar compound.
c. its volume increases by freezing.
d. it decomposes by heat into its elements.

15. A liquid boils at 100°C. What is the other property, which confirms that it is pure water ? .....
a. Sugar dissolves in it.
b. Its density decreases on freezing.
c. It has a neutral effect on both of litmus paper.
d. It evaporates on heating.

16. On the electrolysis of acidified water by using Hofmann's voltameter, the ratio between the volume of the evolved gas at the positive pole to the volume of the evolved gas at the negative pole is ..... respectively.
a. 1 : 2 b. 1 : 1 c. 2 : 1 d. 3 : 1

17. In the electrolysis of acidified water by using "Hofmann's voltameter", the volume of hydrogen gas that evolves is (16 cm^3), so the volume of oxygen gas that evolves is ..... cm^3
a. 16 b. 6 c. 8 d. 10

18. The volume of hydrogen gas evolving from acidified water electrolysis equals ..... the oxygen volume.
a. that of b. twice c. half d. four times

19. All of the following are natural environmental pollutants except .....
a. volcanic eruptions. b. death of living organisms.
c. discharge of factories residues. d. lightning accompanied by thunder storms.

20. Mixing animals and human wastes with water causes ..... water pollution.
a. chemical b. biological c. thermal d. radiant

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21. All of the following diseases are caused by biological water pollution except ..... disease.
a. cancer b. bilharzia c. hepatitis d. typhoid

22. Increasing the concentration of ..... in drinking water causes blindness.
a. lead b. arsenic c. mercury d. chlorine

23. Arsenic increases the infection rate by .....
a. liver cancer. b. brain cancer. c. hepatitis. d. typhoid.

24. ..... water pollution causes the death of marine creatures due to the separation of the dissolved oxygen in water.
a. Biological b. Chemical c. Thermal d. Radiant

25. Which of the following behaviours causes radiant water pollution ? .....
a. Discharging of sewage in seas.
b. Leakage of radioactive materials from nuclear reactor.
c. Discharging factories residues and chemicals in seas.
d. Mixing animals and human wastes with water.

2. Choose from column (B) what suits it in column (A) :

(A) Probable harms	(B) Responsible pollutant
1. Death of brain cells.	a. Lead
2. Liver cancer.	b. Sodium
3. Blindness.	c. Mercury
	d. Arsenic

3. Put (✓) or (✗) and correct the wrong ones :

1. Water molecule consists of one hydrogen atom and two oxygen atoms. ( )
2. Water molecules are linked together by ionic bonds. ( )
3. Water molecule contains one double covalent bond. ( )
4. Covalent bonds in water molecule are stronger than hydrogen bonds. ( )
5. Both oil and sugar are covalent compounds. ( )
6. The density of water in liquid state is higher than its density in the solid state. ( )
7. Water density increases on freezing. ( )
8. Ice crystals have round shape and small volume. ( )
9. Water has a neutral effect on both of litmus paper. ( )
10. During electrolysis of acidified water, the volume of the evolved gas above the anode is half the volume of the evolved gas above the cathode. ( )
11. During electrolysis of acidified water, oxygen gas evolves at the cathode, while hydrogen gas evolves at the anode. ( )

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12. Hofmann's voltameter is used for water ionization. ( )
13. Volcanic eruptions and lightning accompanied by thunder storms are from artificial environmental pollutants. ( )
14. Chemical pollution of water causes many diseases such as typhoid and hepatitis. ( )
15. Eating food containing high concentration of mercury causes the death of brain cells. ( )
16. Discharging factories residues in seas and rivers causes radiant water pollution. ( )

4. Write the scientific term of each of the following :

1. A molecule that consists of two hydrogen atoms and one oxygen atom.
2. A kind of bonds, which arises between oxygen atom and each of hydrogen atoms in water molecule.
3. • A type of weak electrostatic attraction which arises among molecules of some polar compounds.
   • A chemical bond arises between water molecules and each other.
   • A type of bond which is responsible for the abnormal properties of water.
4. A good polar solvent for most of ionic compounds and some of covalent compounds.
5. The apparatus which is used in water electrolysis.
6. The positive pole in Hofmann's voltameter.
7. • The gas which evolves above the anode during water electrolysis.
   • The gas which makes the glowing splint more glowing.
8. The negative pole in Hofmann's voltameter.
9. • The gas which evolves above the cathode during water electrolysis.
   • The gas which burns with a pop sound by using a glowing splint.
10. The addition of any substance to water, which causes continuous gradual change in water properties affecting the health and life of living creatures.
11. A kind of environmental pollutants, which arises from natural phenomenon.
12. A kind of environmental pollutants, which arises from different human activities.
13. • A kind of water pollution, which arises from mixing animal and human wastes with water.
    • A kind of water pollution, which causes the infection by many diseases such as typhoid.
14. A kind of water pollution which arises from the discharge factories wastes and sewage in seas and rivers.
15. A water pollutant which causes the death of brain cells.
16. A water pollutant which causes blindness when its concentration increases in water.
17. A water pollutant which increases the infection rate by liver cancer.
18. • A type of water pollution that results from the increase in the temperature of water which is used in cooling nuclear reactors.
    • A type of water pollution, which causes the death of marine creatures due to the separation of the dissolved oxygen in water.
19. A kind of water pollution, which results from dumping atomic wastes in the oceans and seas.

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5. Complete the following statements :

1. Water is used in many fields such as ..... , ... and .....
2. Water molecule is composed of one ..... atom and two ..... atoms.
3. Water molecules are linked together by ..... bond due to the higher ..... of oxygen with compared to hydrogen.
4. The bond between hydrogen atom and oxygen atom in water molecule is ..... bond, while bonds among water molecules are ..... bonds.
5. Water is a good polar ..... as it has the ability to dissolve most ..... compounds.
6. ..... is an example of ionic compounds, while ..... is an example of covalent compounds, which dissolve in water.
7. Most covalent compounds such as ..... can't dissolve in water as they can't form ..... bonds with water.
8. Pure water boils at ..... and freezes at .....
9. The high boiling point of water is due to the presence of ..... bonds between its molecules.
10. When the temperature of water becomes less than 4°C, its density ..... , while its volume .....
11. When the temperature of water decreases below ....., its molecules are collected together by ..... bonds forming ice crystals.
12. Ice crystals have ..... shape and large .....
13. Water has a ..... effect on both of litmus paper.
14. ..... is an apparatus which is used for the electrolysis of water by using ..... energy.
15. In Hofmann's voltameter, the positive pole is called ..... , while the negative pole is called .....
16. During the electrolysis of acidified water by Hofmann's voltameter, ... gas evolves at the anode, while ..... gas evolves at the cathode.
17. If the volume of the evolved gas at the anode in Hofmann's voltameter is 7 cm^3 therefore, the volume of the evolved ..... gas at the cathode is ..... cm^3.
18. Environmental pollutants are classified into ..... pollutants and ..... pollutants.
19. Water pollution is classified into four main types, which are ..... , chemical, ... and ..... pollution.
20. Biological water pollution causes the infection by many diseases such as ..... , typhoid and .....
21. Eating food containing high concentration of ..... causes the death of the ..... cells.

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- 22. Increasing the mercury concentration in drinking water causes ..... , while increasing arsenic concentration in it, increases the infection rate by .....
- 23. Mixing animals and human wastes with water causes ..... water pollution, while dumping the atomic wastes in oceans causes ..... water pollution.
- 24. Chemical water pollution is produced from the discharging ..... wastes and ..... in seas and rivers.
- 25. ..... water pollution is produced due to increasing the ..... of some marine zones which use water for cooling the nuclear reactors.
- 26. Among the protection ways of water from pollution are developing the stations of water ..... and disinfection of the ..... in a periodical manner.
- 27. We must not store the tap water in ..... bottles because plastic reacts with ..... gas leading to the increase in the infection rates of .....

6. Complete the following table :

Origin of water pollution	Kind of pollution	Harms
1. Discharging factories wastes and sewage in seas and rivers.	..... pollution	• Blindness • ..... • .....
2.	Biological pollution	• ..... • Typhoid • .....
3.	Radiant pollution	_____
4. Using of water of some marine zones for cooling the nuclear reactors.	..... pollution	.....

7. Give reasons for the following :

1. • The boiling point of water is high.
   • The abnormality of water properties.
2. The presence of hydrogen bonds between water molecules.
3. Dissolving of table salt in water.
4. Water has the ability to dissolve most ionic compounds.
5. Although sugar is a covalent compound, it dissolves in water.
6. Oil doesn't dissolve in water.
7. The density of water in solid state (ice) is less than that its density in liquid state.
8. Ice floats on the water surface.

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9. The volume of 5 gm of ice is more than the volume of 5 gm of water at (4°C).
10. Although water of oceans freezes at polar zones, the aquatic creatures are still alive.
11. On putting a glass bottle completely filled with water in a freezer, it will break.
12. 📖 Pure water doesn't affect litmus paper dye.
13. Adding few drops of dilute sulphuric acid to pure water during its electrolysis by Hofmann's voltameter.
14. The glowing of splint increases by approaching it to the anode of Hofmann's voltameter during electrolysis of acidified water.
15. Biological water pollution affect the human health.
16. Chemical water pollution is more dangerous than biological water pollution.
17. It is dangerous to eat fish containing high concentration of lead.
18. Thermal pollution of water leads to the death of marine creatures in it.
19. We should not keep the tap water in plastic bottles of mineral water.

8. What is meant by ...?

1. Hydrogen bond.
2. 📖 Water pollution.

9. What are the results of the following ...?

1. Water molecules are linked together by hydrogen bonds.
2. Decrease in water temperature less than 4°C
3. Putting a glass bottle filled with water in the freezer for a long time.
4. Passing of electric current through Hofmann's voltameter containing acidified water.
5. 📖 Water is polluted by wastes of human and animal.
6. Eating fish contain high concentration of lead.
7. Increase in the concentration of mercury in drinking water.
8. Increase in the ratio of arsenic in drinking water.
9. Dumping the atomic wastes in oceans and seas.
10. 📖 Storing water in plastic bottles of mineral water.

10. 📖 What is the effect of each of the following on the water environment ?

1. Mixing animal and human wastes with water.
2. Drainage of factories wastes in seas and rivers.
3. Using of seas and rivers water as a renewable source for cooling process of the nuclear reactors.

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11. Compare between each of the following :

1. Table salt and food oil [related to : type of the compound - dissolving in water].
2. Bonds between atoms of a water molecule and bonds between water molecules [related to : type - strength].
3. Pure water and acidified water [related to : electric conductivity].
4. Natural environmental pollutants and artificial environmental pollutants.
5. Biological water pollution and chemical water pollution [related to : origin - harms].
6. Thermal water pollution and radiant water pollution [related to : origin of each of them].

12. Mention the importance of :

1. Water.
2. Hofmann's voltameter.

13. The nuclear reactors cause thermal water pollution and radiant water pollution. Explain this phrase.

14. Variant questions :

(1) Mention the properties of water.

(2) Mention the relation between water density and its temperature.

(3) If you have three bottles :

- Bottle (1) has pure water, passing in it carbon dioxide gas.
- Bottle (2) has pure water, added to it an amount of magnesium oxide powder.
- Bottle (3) has pure water, without additions.

How can you differentiate between the three bottles ?

(4) Show by symbolic chemical balanced equations how to get hydrogen from water "by two different ways".

(5) How to keep water from pollution ?

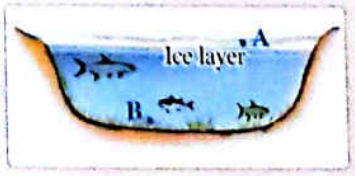
15. Draw a diagrammatic figure with labels for the device which is used in the electrolysis of water.

(Mention the equation of the reaction).

16. Study the following figures, then answer the questions :

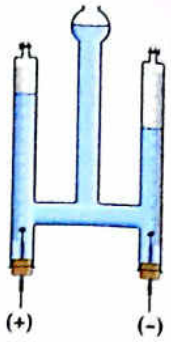
(1) From the opposite figure, answer the following :

1. What are the temperatures at points (A) and (B) ?
2. At which point the density of water is the largest ?



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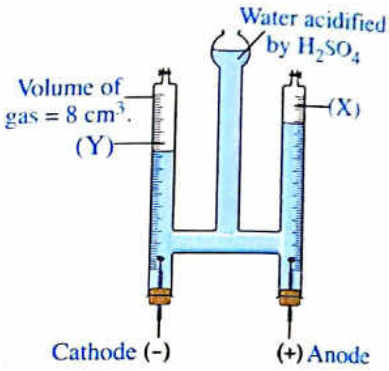
(2) The opposite figure represents Hofmann's voltameter which is used in water electrolysis :



1. Write the chemical equation, which expresses the reaction.
2. What is the volume of the gas, which burns with a pop sound on approaching a glowing splint to it, if the volume of the other gas is 6 cm^3 ?
3. What is the name of the collected gas at :

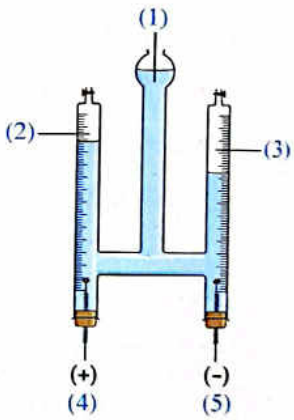
   a. Cathode. b. Anode.

(3) During the electrolysis of acidified water by using Hofmann's voltameter (as shown in the opposite fig.), it was found that the volume of the collected gas in branch Y = 8 cm^3.



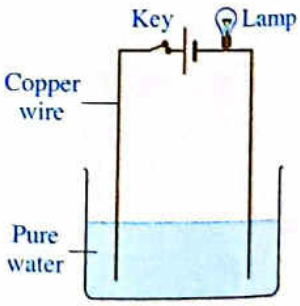
1. What is the name of the collected gas in each of the two branches (X and Y) of the voltameter ?
2. What is the volume of the gas in branch (X) ?

(4) From the opposite figure, answer the following questions :



1. What is the name of this apparatus ? What is its importance ?
2. Label the numbers (1) , (2) , (3) , (4) and (5).
3. Write the balanced chemical equation of this reaction.
4. After opening the tap, what happens if a glowing splint is put above the anode and above the cathode ?
5. Calculate the volume of the gas that evolves at the anode if the volume of the gas that evolves at the cathode is 20 cm^3.

(5) From the opposite electric circuit :



1. Does the lamp illuminate or not ? **(Give a reason).**
2. What will happen if you add drops of sodium carbonate to the pure water ? **(Give a reason).**

17. Creative thinking :

What do you expect for the River Nile pollution after 50 years ?

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Thinking Skills Questions

1. Choose the correct answer :

1. The ratio between the density of water at 4°C to its density at zero°C is ..... one.

   a. more than b. less than c. equal to

2. The density of pure water in the solid state is ..... 1 gm/cm^3.

   a. more than b. equal to c. less than

3. When we put 1 kg of water at 4°C in the freezer to change it into ice, its mass .....

   a. increases. b. decreases. c. doesn't change.

4. The volume of a mass of water at 30°C is ..... the volume of the same mass at 1°C.

   a. more than b. equal to c. less than

5. If the summation of the volume of the two evolved gases at the two poles of Hofmann's voltameter is 60 cm^3, so the volume of hydrogen and oxygen gases respectively is .....

   a. 20 cm^3 , 40 cm^3. b. 40 cm^3 , 20 cm^3. c. 30 cm^3 , 30 cm^3.

2. In the opposite figure :

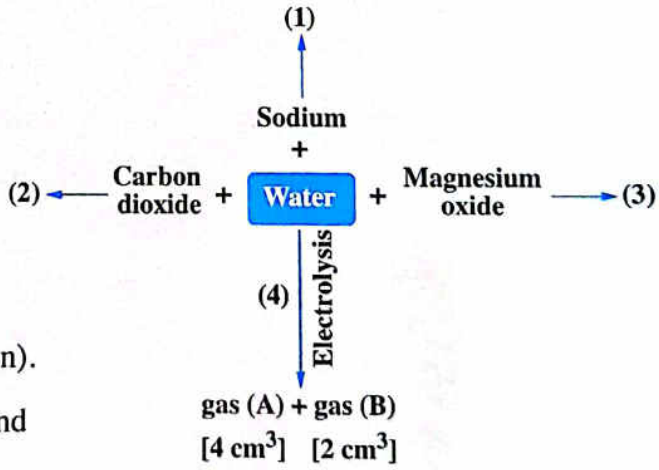
a. Write the names of the resultants of the reactions (1) , (2) and (3).

b. What is the type of solution formed from the reactions (2) and (3) ?

c. What is the effect of the solution formed from reaction number (1) on the litmus paper ? (Give a reason).

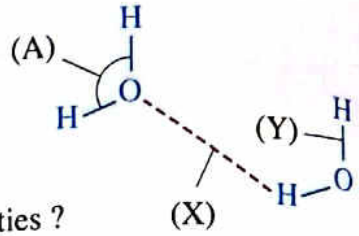
d. (1) Mention the name of the gas (A) and gas (B) which are produced from the electrolysis of acidified water.

(2) What is the device used in the process number (4) ?



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3. From the opposite figure, answer the following :



1. Mention the kind of bonds (X) and (Y).
2. Which one is stronger ?
3. Which one is responsible for the abnormality of water properties ?
4. Complete :
   (a) The figure represents the structure of ..... molecules.
   (b) The angle (A) equals .....

4. What happens if ... ?

1. There are no hydrogen bonds between water molecules.
2. The density of water at (– 6°C) is equal to its density at 5°C in cold polar regions.

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Project

On UNIT ONE



A project to develop the critical thinking
"Decision-making"

1. **"Factories wastes and sewage contain high concentration of lead, mercury and arsenic".**

   What is the decision you will make if you are the minister of water resources and irrigation ?

2. **"Most metals have more density than that of water".**

   Mention three elements that can be used to prove that there are metals have density less than 1 gm/cm^3.

3. **"Mendeleev arranged 67 elements in a table known by his name".**

   What decision would Mendeleev make if the discovery of energy levels was known in his time ?

4. **"Sulphur element is located in period three and group (6A) in the modern periodic table".**

   Identify three information that are needed to make a decision about locating germanium element in the periodic table.

5. **"Berzelius classified the elements into metals and nonmetals before knowing the structure of the atom".**

   What is the appropriate standard that is used now for classifying elements ?

6. **"All nonmetal oxides dissolve in water, while some metal oxides dissolve in water".**

   What is the appropriate standard for distinguishing between a metal oxide and a nonmetal oxide that both of them dissolve in water ?

7. **"The ice cover dominates the North and South poles".**

   What would you do if you were a resident of one of these areas and you have been asked to provide a meal of fish ?

8. **"Hydrogen element is put at the top of group (1A) in the periodic table".**

   What justification would you offer if you decided to put hydrogen at the top of group (7A) ?

9. **"Compounds are classified into polar compounds and non-polar compounds".**

   On what basis will you decide that a compound made up of two atoms is one of polar compounds ?

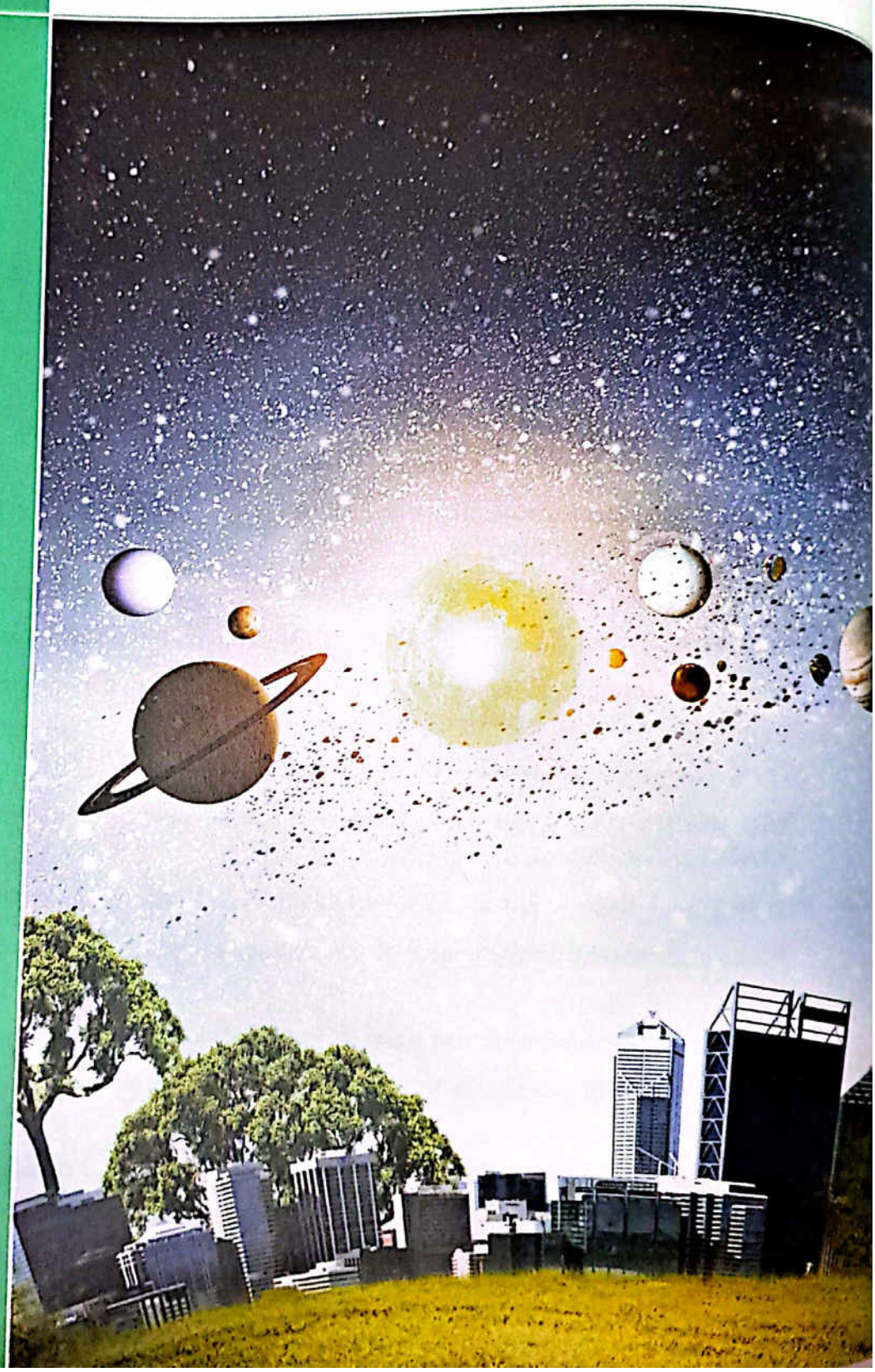
10. **"Mendeleev predicted the discovery of an unknown element called Eka-boron".**

    What position did scientists decide to put this element in the modern periodic table ?

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UNIT 2

The Atmosphere and Protecting The Planet Earth



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Lesson 1	The Atmospheric Layers.
Lesson 2	Erosion of Ozone Layer and Global Warming.

Unit Objectives :

By the end of this unit, students will be able to :

- Know the concept of atmospheric pressure and layers of atmospheric envelope.
- Interpret the change of atmospheric pressure with changing height above sea level.
- Appreciate the importance of instruments that measure atmospheric pressure.
- Describe the characteristics of atmospheric layers.
- Compare among the characteristics of atmospheric layers.
- Conclude the importance of each layer of atmosphere.
- Recognize the importance of studying each layer of the atmosphere.
- Appreciate the role of scientists to reach devices measuring atmospheric pressure.
- Know the composition of ozone gas.
- Conclude the steps of ozone formation.
- Aware of the importance of ozone layer for the human and living organisms.
- Describe harmful effects for pollutants of ozone layer.
- Determine ways to protect ozone layer.
- Describe the global warming phenomenon and greenhouse effect.
- Identify greenhouse gases.
- Explain the increase in the temperature of atmospheric envelope of the Earth.
- Determine the negative effects resulted from the rising temperature of the Earth's atmosphere.

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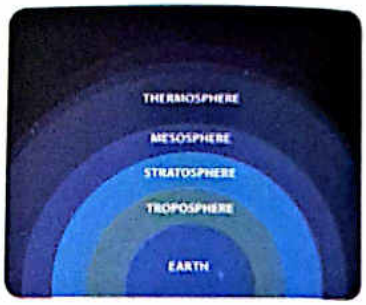
LESSON 1

The Atmospheric Layers



What are the atmospheric layers and their importance ?

Air forms a gaseous envelope surrounds the Earth known as **atmospheric envelope** or **atmospheric air**.



Atmospheric envelope:

It is a gaseous envelope surrounding the Earth, that rotates with the Earth around its axis and extends for about 1000 km above sea level.

In this lesson we will study :

- *Atmospheric pressure.*
- *Layers of the atmospheric envelope.*

Atmospheric pressure

- We know that any matter has a mass, a volume and a weight, so the atmospheric envelope of the Earth has a weight known as the atmospheric pressure.



Atmospheric pressure

Atmospheric pressure:

It is the weight of air column of an atmospheric height on a unit area ($1m^2$).

The atmospheric pressure is measured by a unit called **a bar** or **a millibar**.

1 bar (b) = 1000 millibar (mbar)

The atmospheric pressure at the sea level is known as **normal atmospheric pressure,** and it equals 1013.25 mbar .

Normal atmospheric pressure:

It is the atmospheric pressure at sea level.

Enrichment information

The internal pressure in the human body is equivalent to the external atmospheric pressure.

The change of atmospheric pressure with the change in height above sea level

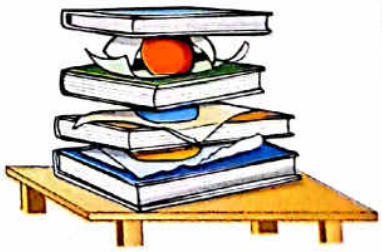
Activity **To show how atmospheric pressure changes by changing the height above sea level :**

Materials :



- 4 large books.
- 6 plastic sheets.
- 3 pieces of clay of different colours.

Steps :



1. Form 3 similar spheres of clay of different colours.
2. Put the clay spheres between plastic sheets and books (as shown in the figure).

Observations :

- The shapes of clay spheres change by the effect of the weight of the books on them.
- The change in the shape of lower clay sphere (yellow colour) is the maximum, due to increasing the pressure on it by the effect of the weight of the three books, while the change in the shape of higher clay sphere (red colour) is the minimum, due to decreasing the pressure on it by the effect of the weight of one book.

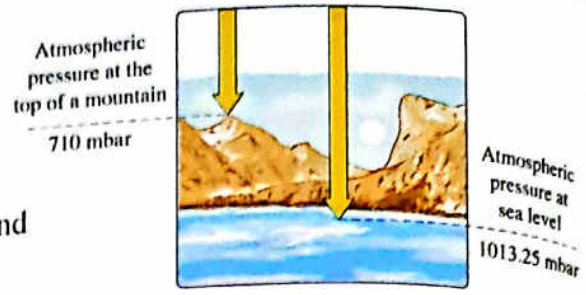
Conclusion:

The change in the shape of clay spheres increases by increasing the number of books (or height) due to the increase in their weights (or pressures), and vice versa.

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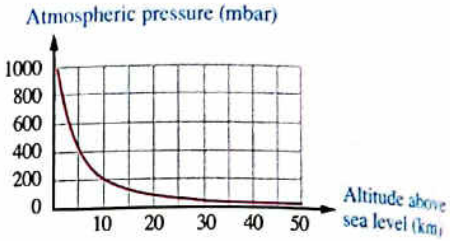
Similarly :

- **The atmospheric pressure decreases on going above the sea level G.R.**
  Due to decreasing the length of air column and thus its weight decreases.
- **The atmospheric pressure increases on going under the sea level G.R.**
  Due to increasing the length of air column and thus its weight increases.



The atmospheric pressure decreases on going above sea level

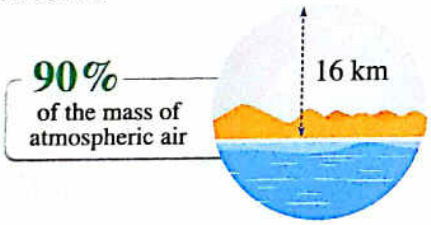
G.R. ***The atmospheric pressure differs from an area to another on the Earth's surface.***
Due to the difference in the length of air column from an area to another on the Earth's surface.



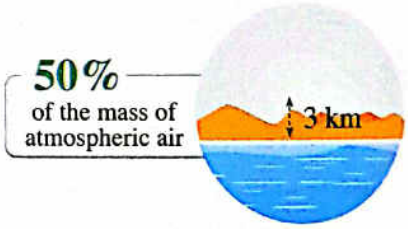
The relation between the altitude above sea level and the atmospheric pressure (Inverse relationship)

Notes

90 % of the mass of atmospheric air is present up to **16 km height** above the sea level.



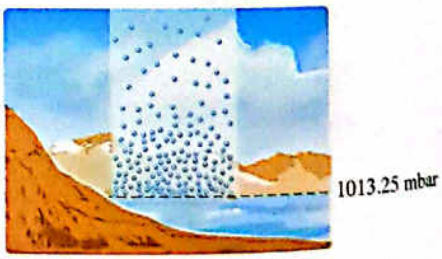
50 % of the mass of atmospheric air is present up to **3 km height** above the sea level.



What happens to ...?

The density of air on going above sea level.

➲ The density of air decreases.



Density of air at the top of a mountain is less than its density at the foot of the mountain

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Exercise

Rearrange the values of atmospheric pressure according to the given arranged elevations above the sea level.

Elevation above sea level (km)	3	6	9	12
Atmospheric pressure (mbar)	203	731	323	503

Answer

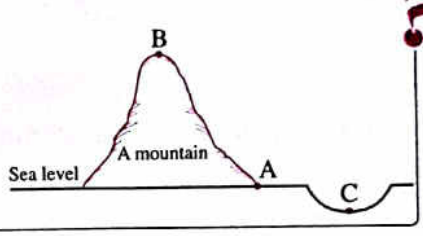
Elevation above sea level (km)	3	6	9	12
Atmospheric pressure (mbar)	731	503	323	203

Question

From the opposite figure, at which points :

1. Atmospheric pressure is the maximum.
2. Air density is the minimum.

"Give an explanation at each case"



The instruments of measuring the atmospheric pressure

- The atmospheric pressure is measured by instruments called **barometers** which are shown in the following table :

Instrument	Figure	Importance
Aneroid		It is used to determine the possible day weather based on the atmospheric pressure.
Altimeter	 Analog Altimeter  Digital Altimeter	It is used in aeroplanes to measure the elevation of navigation based on the atmospheric pressure.

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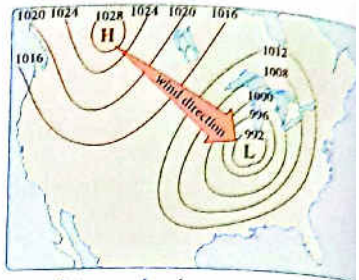
Enrichment information

The greatest atmospheric pressure could be recorded on the surface of the Earth in January, 1968 in Siyberia and it was 1080 mbar, whereas the lowest atmospheric pressure was in the centre of the tropical hurricane "Typhoon" in 1979 and it was 870 mbar.

Atmospheric pressure maps

In atmospheric pressure maps, points of **equal pressure** are joined by curved lines known as **Isobar**.

Isobar :
Curved lines that join the points of equal pressure in atmospheric pressure maps.



Atmospheric pressure map

- The centre of **high** atmospheric pressure areas is represented by "H".
- The centre of **low** atmospheric pressure areas is represented by "L".

Importance

- The atmospheric pressure maps are used to detect the directions of winds as winds move from the areas of **high** atmospheric pressure to the areas of **low** atmospheric pressure.

G.R. ***Wind moves from an area to another on the Earth's surface.***
Due to the difference in atmospheric pressure from an area to another on the Earth's surface, where the wind moves from the areas of high atmospheric pressure to the areas of low atmospheric pressure.

Layers of the atmospheric envelope

The atmospheric envelope consists of four layers above sea level, which are classified according to :

- *The change in atmospheric pressure.*
- *The change in temperature.*

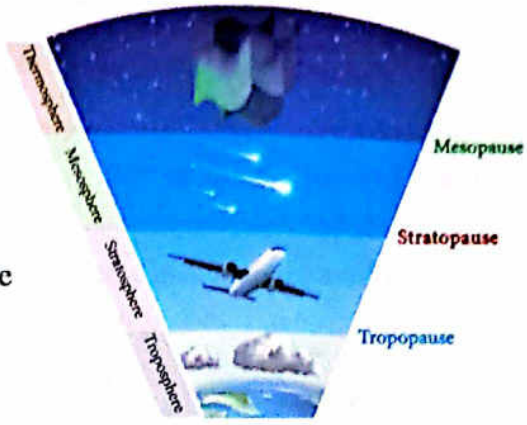
Layers of the atmospheric envelope

1 Troposphere — 2 Stratosphere — 3 Mesosphere — 4 Thermosphere

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There is a region between each two successive layers. In these regions, temperature remains constant, these regions are:

1. **Tropopause** is the region between troposphere and stratosphere.
2. **Stratopause** is the region between stratosphere and mesosphere.
3. **Mesopause** is the region between mesosphere and thermosphere.



Layers of the atmospheric envelope

1 Troposphere

It means the disturbed layer G.R.

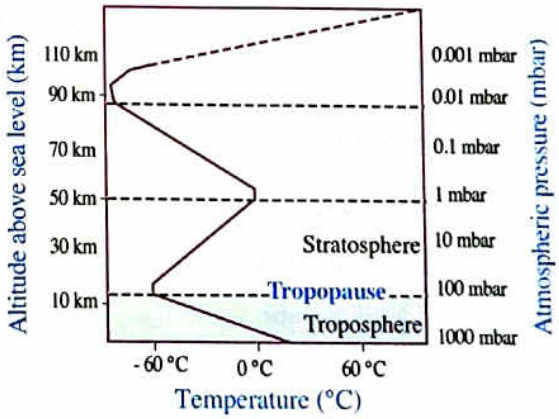
Because all atmospheric turbulences (weather changes) take place in it.

Location

It is the first layer of atmospheric envelope.

Characteristics (properties) and importance of troposphere layer :

Study the opposite figure to know the properties of troposphere layer :



Thickness

It extends for about **13 km** above sea level to the tropopause (**i.e.** the thickness of troposphere layer is **13 kilometres**).

Enrichment information

Troposphere thickness is about 8 km above the two poles and 18 km at the equator , so average troposphere thickness $= \frac{8 + 18}{2} = 13$ *km.*

Pressure

The atmospheric pressure in this layer **decreases** as we go up until it becomes 100 mbar nearly at its top (100 mbar = 0.1 bar 0.1 of the normal atmospheric pressure at the sea level).

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Importance

- **All weather phenomena are present in troposphere layer** G.R.
  Because it contains about 75% of the total mass of the atmospheric air.
- **Troposphere layer organizes the Earth's temperature** G.R.
  Because it contains 99% of the total atmospheric water vapour.



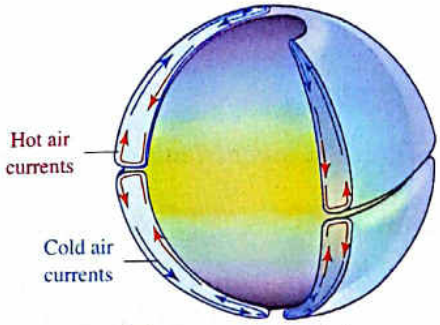
Clouds and winds

Note

Weather phenomena such as rains, wind, clouds, ... etc. take place in troposphere layer that form the weather conditions and consequently up the climate, that affect the activities of living organisms.

Air movement

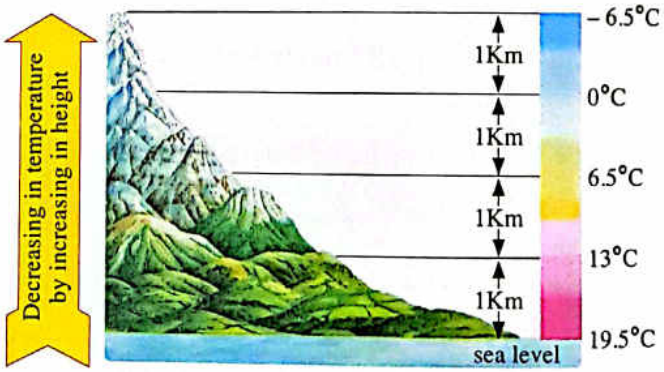
The air movement in this layer is vertical G.R.
Because the hot air currents (of less density) move upwards, while cold air currents (of high density) move downwards.



The movement of air currents

Temperature

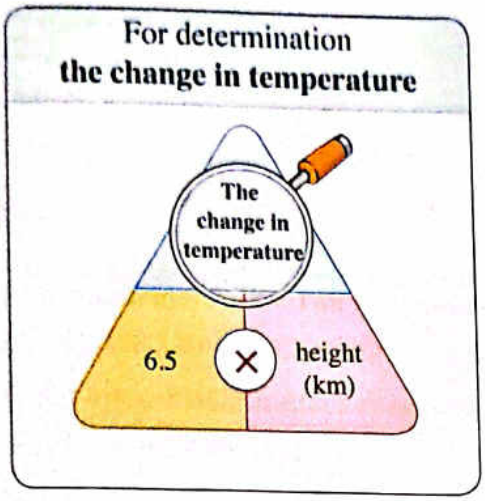
The temperature of this layer **decreases** at a rate **(6.5°C)** for each **(1 km)** height, until it reaches the lowest value of about **(– 60°C)** at tropopause.

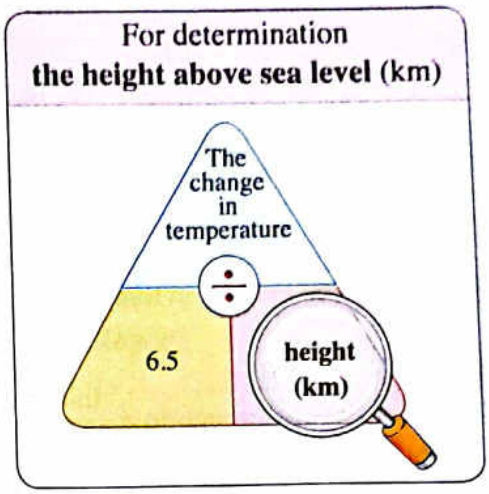


Decreasing in temperature by a rate 6.5°C for each 1 km height.

We can calculate the amount of change in the temperature in troposphere layer using the following relation :

The amount of change in temperature (decrease or increase) = the height above sea level (km) × 6.5





We can calculate the temperature at the top of a mountain or at its foot from the following relations :

The temperature at the top of a mountain = the temperature at its foot – the amount of decrease in temperature

The temperature at the foot of a mountain = the temperature at its top + the amount of increase in temperature

Example

If the temperature at the foot of Everest mountain is 20.6°C, find the temperature at its top of height 8862 m above the sea level.

Solution

- Height in kilometres = 8862 ÷ 1000 = 8.862 km
- The amount of decrease in temp. = the height above sea level (km) × 6.5
  = 8.862 × 6.5 = 57.6°C
- Temperature at the top of the mountain = temp. at its foot – the amount of decrease in temp.
  = 20.6 – 57.6 = – 37°C

We can calculate the amount of change in the temperature by knowing the temperature at the top and the foot of a mountain from the following relation :

The amount of change in temperature = temperature at the foot of the mountain – temperature at the top of the mountain

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Example

Calculate the hight of a mountain, if you know that the temperature at it's foot is 20°C and at it's top is –6°C.

Solution

- The amount of change in temperature = temperature at its foot – temperature at its top

$$= 20 - (-6) = 26°C$$

- The height of the mountain $= \frac{\text{the amount of change in temp.}}{6.5} = \frac{26}{6.5} = 4$ km

Example

In the opposite figure, calculate :

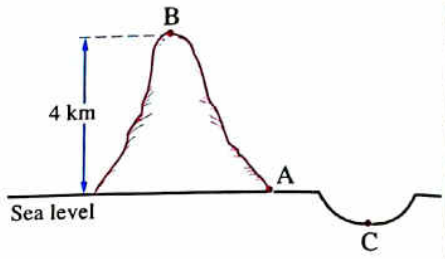
(1) The temperature at point (A)

(2) The vertical distance between point (B) and point (C).

If you know that :

- The temperature at point (B) = – 5°C

- The temperature at point (C) = 27.5°C



Solution

1. The amount of increase in temp. (B : A) = the height above sea level (km) × 6.5

$$= 4 \times 6.5 = 26°C$$

The temp. at point (A) = the temp. at point (B) + the amount of increase in temp.

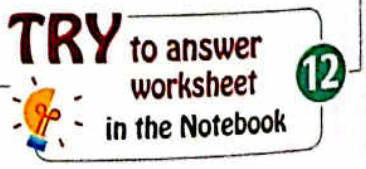
$$= (-5) + 26 = 21°C$$

2. ∵ The amount of change in temp. (C : B) = the temp. at point (C) – the temp. at point (B)

$$= 27.5 - (-5) = 32.5°C$$

∴ The vertical distance between point (B) and point (C)

$$= \frac{\text{the amount of change in temp.}}{6.5} = \frac{32.5}{6.5} = 5 \text{ km}$$



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2 Stratosphere

It is called the ozonic atmospheric envelope. G.R.

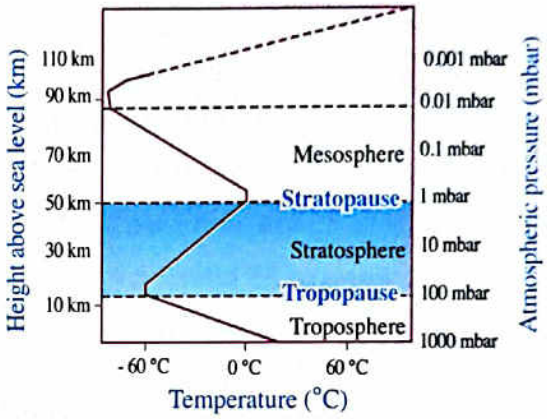
Because it contains most of ozone gas (O_3).

Location

It is the second layer of atmospheric envelope.

Characteristics and importance of stratosphere layer :

Study the opposite figure to know the properties of stratosphere layer :



Thickness

It extends from tropopause (at a height of **13 km** above sea level) to stratopause (at a height of **50 km** above sea level), with a thickness of **37 kilometres**.

Pressure

The atmospheric pressure in this layer **decreases** as we go up until it becomes 1 mbar at its top (1 mbar = 0.001 bar 0.001 of the normal atmospheric pressure at the sea level).

Importance

It contains most of ozone gas (O_3), which extends from 20 km to 40 km height above sea level , so it is called **the ozonic atmospheric envelope**.

Air movement

The lower part of this layer does not contain clouds or weather disturbances and the air movement is **horizontal,** so pilots prefer to fly their planes in the lower part of this layer.



Flying in stratosphere

Temperature

At the lower part, the temperature is constant and measure (– 60°C), then increases gradually until it reaches (0°C) at the top of the layer G.R.

This is due to the absorption of ultraviolet rays (emitted from the Sun) by ozone layer which is present at the upper part of this layer.

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3 Mesosphere

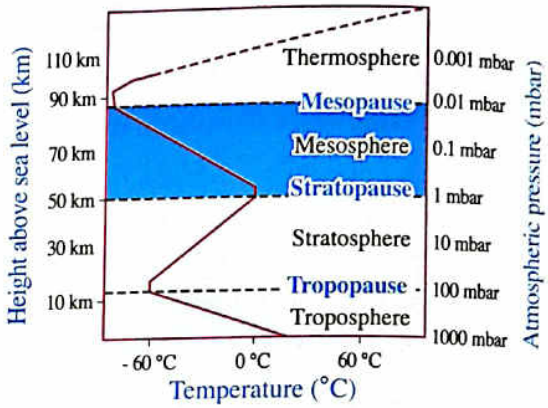
It is the middle layer, so it called mesosphere (**meso** means **middle**).

Location

It is the third layer of atmospheric envelope.

Characteristics and importance of mesosphere layer :

Study the opposite figure to know the properties of mesosphere layer :



Thickness

It extends from stratopause (at a height of **50 km** above sea level) to mesopause (at a height of **85 km** above sea level), with a thickness of **35 kilometres**.

Pressure

The atmospheric pressure in this layer **decreases** as we go up, until it becomes **0.01 mbar** at its top.

Importance

It protects the planet Earth from celestial rocky masses that enter the atmospheric envelope of Earth, where some of them burn completely as a result of their friction with air molecules forming luminous meteors.



Formation of luminous meteors in mesosphere

G.R. ***Mesosphere layer is much vacuumed (highly rarefied).***
Because it contains a limited amount of helium and hydrogen gases only.

Temperature

Mesosphere is considered the coldest layer G.R.
Because the temperature in this layer decreases at a high rate as we go up until it reaches (– 90°C) at its top.

▸ Enrichment information

Although meteors are burnt in mesosphere layer, spaceships don't burn during passing through it because their conical fronts disperse the heat and their tails are made of an insulated material.

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4 Thermosphere

It is called the thermal layer G.R.

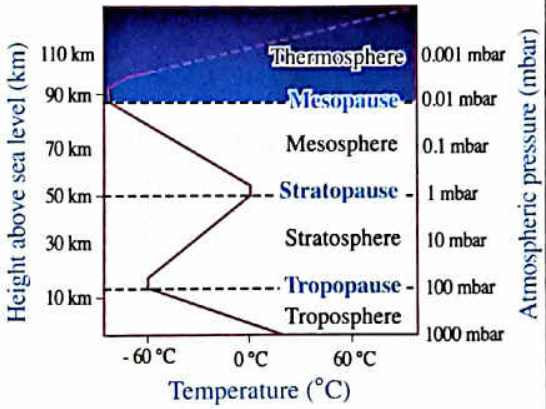
Because it is the hottest layer of atmospheric envelope.

Location

It is the fourth layer of atmospheric envelope.

Characteristics and importance of thermosphere layer :

Study the opposite figure to know the properties of thermosphere layer :



Thickness

It extends from mesopause (at a height of **85 km** above sea level) to a height of **675 km** above sea level, with a thickness of **590 kilometres.**

Temperature

The temperature of this layer **increases** at a high rate as we go up until it reaches **(1200°C)** at its top , so it is called the thermal layer.

G.R. ***The upper part of thermosphere layer is called ionosphere.***

Because it contains charged ions.

Ionosphere layer

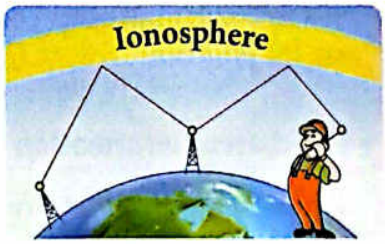
Ionosphere layer:

It is a layer that contains charged ions and it exists in the upper part of thermosphere and extends up to 700 km above sea level.

Importance

It is very important in wireless communications and broadcasting G.R.

Because it reflects radio waves transmitted by radio stations and communication centres.

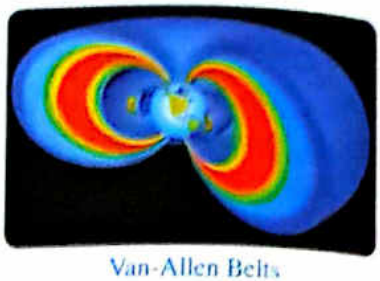


Reflection of radio waves from ionosphere

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Van-Allen Belts

Ionosphere is surrounded by two magnetic belts known as **Van-Allen Belts** which is related to the scientist Van-Allen who discovered them.



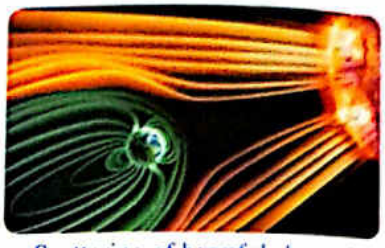
Van-Allen Belts

Van-Allen Belts:

They are two magnetic belts surrounding ionosphere.

Importance

These belts play an important role in scattering of harmful charged cosmic radiations away from the Earth which cause the occurrence of **Aurora phenomenon.**



Scattering of harmful charged cosmic radiations away from the Earth

Aurora phenomenon:

It is a phenomenon that appears as brightly coloured light curtains seen at both the north and south poles of the Earth.

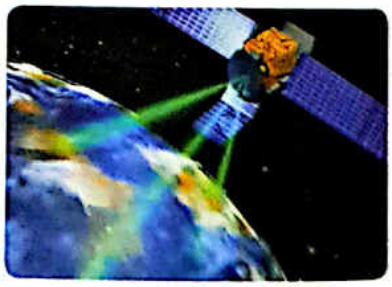


Aurora phenomenon

Exosphere layer

Exosphere:

It is a region in which the atmospheric envelope is inserted in outer space.



Role of satellites in wireless communications

Importance

Satellites float in exosphere [around the Earth] are used to transmit weather condition information and TV programs.

Enrichment information

The Egyptian satellite (Nile sat) transmits a number of different educational channels which you can watch through the digital space channels.

TRY to answer worksheet 13 in the Notebook

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Remember Lesson One



Atmospheric envelope :

It is a gaseous envelope surrounding the Earth that rotates with it around its axis and it extends for about 1000 km above sea level.

Atmospheric pressure :

It is the weight of air column of an atmospheric height on a unit area ($1m^2$).

Normal atmospheric pressure :

It is the atmospheric pressure at sea level which equals 1013.15 mbar.

- 50 % of the mass of atmospheric air is present up to 3 km height above the sea level.
- 90 % of the mass of atmospheric air is present up to 16 km height above the sea level.

The instruments of measuring the atmospheric pressure :

- The atmospheric pressure is measured by instruments called barometers.
- Among the most famous types of barometers are aneroid and altimeter.
- **Aneroid** is used to determine the possible day weather.
- **Altimeter** is used in aeroplanes to measure the elevation of navigation.

Isobar :

Curved lines that join the points of equal pressure in atmospheric pressure maps.

- Wind moves from the areas of high atmospheric pressure to the areas of low atmospheric pressure.

Atmospheric layers :

- We can classify the atmospheric envelope into four layers according to :
  * The change in atmospheric pressure.
  * The change in temperature.

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675 Km	**Thermosphere** (590 Km)	- The hottest layer. - Its upper part contains charged ions which extends up to 700 km above the sea level, therefore this part is known as ionosphere. **Ionosphere :** - It is very important in wireless communications and broadcasting.  - It is surrounded by two magnetic belts known as **Van-Allen Belts**.	**at its top** **Temperature:** (1200°C) **Atmospheric pressure:** (0.001 mbar)
85 Km	**Mesosphere** (35 Km)	- The coldest layer. - It contains a limited amount of helium and hydrogen gases only, so it is much vacuumed (highly rarefied).  - It protects the planet Earth from celestial rocky masses that enter the atmospheric envelope of Earth.	**at its top** **Temperature:** (– 90°C) **Atmospheric pressure:** (0.01mbar)
50 Km	**Stratosphere** (37 Km)	- It is called the ozonic atmospheric envelope. - It contains most of ozone gas which extends from 20 km to 40 km above sea level.  - Pilots prefer to fly their planes in this layer. - Air movement in this layer is horizontal.	**at its top** **Temperature:** (0°C) **Atmospheric pressure:** (1mbar)
13 Km	**Troposphere** (13 km)	- It means the disturbed layer. - It contains : * About 75% of the mass of the atmospheric air. * 99% of atmospheric water vapour.  - Air movement in this layer is vertical.	**at its top** **Temperature:** (– 60°C) **Atmospheric pressure:** (100 mbar)
Sea level			

✪ Van-Allen Belts :

They are two magnetic belts surrounding ionosphere and play an important role in scattering harmful charged cosmic radiations.

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Questions ? on lesson one

Interactive Exercises

● Remember ● Understand ○ Apply ⁂ Higher skills 🕮 School book questions.

1. Choose the correct answer :

1. The height of atmospheric envelope is about ..... above sea level.
   a. 1000 km b. 1000 m c. 1000 mbar d. 13 km
2. Atmospheric pressure is the ..... of air column of an atmospheric height on a unit area.
   a. mass b. volume c. weight d. density
3. The measuring unit of atmospheric pressure is .....
   a. bar. b. Newton. c. millimetre. d. millilitre.
4. A device that is used in measuring the atmospheric pressure is .....
   a. barometer. b. voltmeter. c. ammeter. d. speedometer.
5. 🕮 The normal atmospheric pressure equals ..... mbar at sea level.
   a. 76 b. 1013.25 c. 1.013 d. 760
6. As the density of air increases, the atmospheric pressure .....
   a. increases. b. decreases. c. doesn't change. d. doesn't affect.
7. ..... is an instrument used by pilots in aeroplanes to measure their elevation above sea level based on atmospheric pressure.
   a. Altimeter b. Thermometer c. Aneroid d. Digital balance
8. The amount of change in the temperature at any height in troposphere is given by .....
   a. height in metres × 6.5 b. height in km + 6.5
   c. height in km × 6.5 d. height in km ÷ 6.5
9. Temperature decreases by ..... at 2 km above sea level.
   a. 6.5°C b. 13°C c. 5.6°C d. 9.75°C
10. All the atmospheric phenomena on the Earth like rains, winds and clouds take place in ..... layer.
    a. mesosphere b. stratosphere c. thermosphere d. troposphere
11. Water vapour in troposphere ..... the temperature on the Earth.
    a. organizes b. decreases c. increases d. has no effect on
12. ..... is the second layer of atmospheric envelope.
    a. Thermosphere b. Stratosphere c. Troposphere d. Mesosphere
13. 🕮 ..... is located between stratosphere and mesosphere.
    a. Thermopause b. Mesopause c. Stratopause d. Tropopause

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14. Ozone layer is found in ..... layer.
a. troposphere b. stratosphere c. mesosphere d. thermosphere

15. The air moves ..... in the stratosphere layer.
a. horizontally b. vertically
c. inclined d. randomly

16. Pilots prefer to fly their planes in the lower part of ....., because there are no weather disturbance and air moves horizontally.
a. thermosphere b. mesosphere
c. troposphere d. stratosphere

17. The coldest atmospheric layer in the atmospheric envelope is .....
a. troposphere. b. stratosphere. c. mesosphere. d. thermosphere.

18. The thickness of mesosphere layer is ..... km.
a. 1000 b. 13 c. 590 d. 35

19. The temperature at the top of mesosphere layer reaches .....
a. 76°C b. – 90°C c. – 60°C d. 1200°C

20. The ..... layer is much vacuumed layer.
a. troposphere b. stratosphere c. mesosphere d. thermosphere

21. Meteors are formed in ..... layer.
a. ionosphere b. stratosphere c. mesosphere d. exosphere

22. The hottest atmospheric layer in atmospheric envelope is .....
a. troposphere. b. stratosphere. c. thermosphere. d. mesosphere.

23. Ionosphere layer is surrounded by two ..... belts.
a. electric b. ionic c. magnetic d. thermal

24. Ionosphere layer is located in the upper part of ..... layer.
a. stratosphere b. troposphere c. mesosphere d. thermosphere

25. The charged cosmic radiations are dispersed in the ..... layer.
a. troposphere b. stratosphere c. mesosphere d. ionosphere

2. Choose from column (B) what suits it in column (A) :

(1)

(A)	(B)
1. Troposphere	a. The coldest layer in atmospheric envelope.
2. Mesosphere	b. The layer that is suitable for flying aeroplanes.
3. Stratosphere	c. An instrument used to measure atmospheric pressure.
4. Thermosphere	d. The layer that contains all weather phenomena.
	e. The hottest layer in atmospheric envelope.

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(2)

(A)	(B)
1. Mesopause	a. is the region between thermosphere and the outer space.
2. Tropopause	b. is the region between mesosphere and thermosphere.
3. Stratopause	c. is the region between stratosphere and mesosphere.
4. Exosphere	d. is the region between troposphere and stratosphere.
	e. its thickness is about 13 km above the sea level.

3. Put (✓) in front of correct statements and (×) in front of incorrect ones, then correct them :

1. The atmospheric envelope rotates with the Earth around its axis. ( )
2. The atmospheric pressure is the mass of air column above a unit area. ( )
3. 50 % of the mass of the atmospheric envelope is present in the area between the sea level and 3 km height. ( )
4. The atmospheric pressure decreases on going above sea level. ( )
5. The density of air increases as we go up. ( )
6. Altimeter is an instrument used to determine the elevation of aeroplanes above sea level. ( )
7. Wind moves from regions of high atmospheric pressure to that of low atmospheric pressure. ( )
8. Troposphere is the first layer of atmospheric envelope. ( )
9. Stratopause is the region between stratosphere and troposphere. ( )
10. All weather phenomena like rains, winds and clouds take place in ionosphere layer. ( )
11. The thickness of troposphere layer is 37 kilometres. ( )
12. Mesosphere layer contains 99% of atmospheric water vapour which organizes the Earth's temperature. ( )
13. The atmospheric pressure in stratosphere layer increases as we go up until it becomes 0.001 bar. ( )
14. Pilots prefer to fly their aeroplanes in the upper part of mesosphere. ( )
15. Stratosphere is the third layer in the atmospheric envelope. ( )
16. Ozone layer is found in thermosphere layer. ( )
17. Meteors are formed in mesosphere layer due to their friction with air molecules. ( )
18. Mesosphere is the coldest layer in the atmospheric envelope. ( )
19. The temperature of the fourth layer increases at a high rate as we go up until it reaches 1200°C at its top. ( )
20. The ionosphere is surrounded by two Van-Allen belts, which are responsible for scattering the harmful cosmic rays away from the Earth. ( )

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21. Aurora phenomenon is considered as coloured brightly light curtains seen at north and south poles of the Earth. ( )
22. The atmospheric envelope is inserted in the outer space in a region known as ionosphere. ( )
23. Satellites revolve around the Earth in a region called the exosphere. ( )

4. Write the scientific term of each of the following :

1. The gaseous envelope which surrounds the Earth, and is rotating with it around its axis.
2. The weight of air column of an atmosphere height above a unit area.
3. The measuring unit of atmospheric pressure.
4. The atmospheric pressure at sea level.
5. The device used to measure the atmospheric pressure.
6. The barometer used to determine the possible day weather.
7. The barometer used by pilots in aeroplanes to measure their elevations above the sea level.
8. The curved lines that join the points of equal pressure in atmospheric pressure maps.
9. The region between troposphere and stratosphere layers.
10. 🕮 The boundary separating between stratosphere and mesosphere where temperature is rather constant.
11. The region between mesosphere and thermosphere.
12. An atmospheric layer, in which air currents move vertically.
13. • The ozonic atmospheric envelope.
    • An atmospheric layer in which air moves horizontally.
    • The atmospheric layer, at which pilots prefer to fly.
14. • The coldest atmospheric layer.
    • The atmospheric layer, which contains a limited amount of hydrogen and helium gases only.
15. The hottest atmospheric layer.
16. 🕮 A charged layer reflects radio waves.
17. Two magnetic belts that help in scattering of harmful cosmic radiations away from the Earth.
18. • The phenomenon that appears due to scattering of harmful charged radiations by Van-Allen Belts.
    • A phenomenon that appears as brightly coloured light curtains seen at the both poles of the Earth.
19. • The region in which the atmospheric envelope is inserted in outer space.
    • The region in which satellites orbit around the planet Earth.

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5. Complete the following statements :

1. The Earth is surrounded by ..... envelope known as .....
2. The atmospheric air of the Earth has a weight known as .....
3. Bar is the unit used to measure .....
4. 1 bar = ... millibar.
5. Normal atmospheric pressure equals ..... mbar at the sea level.
6. ..... is a type of barometers used to determine the possible day weather, while ..... is the instrument used to measure the altitude of aeroplanes above sea level.
7. The atmospheric pressure ..... by increasing the length of air column.
8. As we go up to the top of a mountain, the atmospheric pressure ..... because the height of air column .....
9. 50% of the mass of atmospheric air is present in the area between sea level and ..... km height, but ..... % of its mass is present up to 16 km height.
10. The density of air at the top of a mountain is ..... than the density of air at the sea level.
11. Wind moves from the areas of ..... atmospheric pressure to that of ..... atmospheric pressure.
12. The atmospheric envelope consists of ..... layers which are ..... , stratosphere, mesosphere and .....
13. The region between the first and the second layers is called ..... , while ..... is the region between the third and the fourth layers.
14. ..... is the first layer of atmospheric envelope and its thickness is about .....
15. The temperature of the troposphere decreases at a rate ..... °C for each ..... height.
16. The atmospheric pressure at the top of troposphere layer becomes ..... and the temperature reaches the lowest value for about ..... at its top.
17. Troposphere contains about ..... % from atmospheric envelope mass and about ..... % from atmospheric water vapour.
18. Air movement in troposphere is ..... , where hot air currents move ....., while cold air currents move .....
19. The second atmospheric layer is ..... , which is also called the ..... layer.
20. Stratosphere extends with a thickness equals ..... km.
21. In the lower part of stratosphere, temperature is constant at ..... °C, then it increases gradually until it reaches ..... °C at its top.
22. In the upper part of stratosphere , ... layer is found which absorbs ..... rays emitted from the Sun.

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23. The atmospheric pressure in stratosphere layer ..... as we go up till it becomes ..... of the normal pressure.
24. Pilots prefer to fly their aeroplanes in the ..... part of stratosphere due to the absence of ..... and turbulences.
25. Stratosphere contains most of ..... gas, which is found in atmospheric envelope and it extends from ..... to ..... km above sea level.
26. The third layer in atmospheric envelope is ..... , and its thickness is about .....
27. The temperature in mesosphere ..... as we go up until it reaches ..... at the top.
28. Mesosphere layer is highly rarefied, because it contains a limited amount of ..... and ..... gases only.
29. The fourth layer in atmospheric envelope is ..... , which is also called ..... layer, because it is the hottest layer in the atmospheric envelope.
30. The temperature of thermosphere layer ..... as we go up until it reaches ..... °C.
31. The upper part of thermosphere layer is called ..... and it extends up to ..... km above sea level.
32. 🕮 The highest temperature layer in the atmosphere is ..... and the least temperature one is .....
33. Ionosphere is surrounded by two magnetic belts known as ..... Belts, which play an important role in scattering of harmful charged cosmic radiations away from the .....
34. Phenomenon of ..... appears as brightly coloured light curtains seen at the two ..... of the Earth.
35. 🕮 Most of weather features occur in ..... layer, whereas satellites rotate in the ..... layer.

6. Complete the following table :

Atmospheric layer	Order	Thickness	Temperature at its top
1.	The second	.....	.....
2. Thermosphere	.....	.....	.....
3.	.....	.....	– 90°C
4.	.....	13 km	.....

7. Give reasons for :

1. The atmospheric pressure decreases on going above the sea level.
2. The atmospheric pressure differs from an area to another on the Earth's surface.
3. Altimeter instrument is important for navigation.
4. Winds blowing from a region to another on the Earth's surface.

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5. The troposphere layer is called by this name.
6. The temperature at the top of a mountain is less than that at its foot.
7. Rains, clouds and winds are present in troposphere layer.
8. Troposphere layer regulates the Earth's temperature.
9. The air motion in troposphere layer is vertical.
10. The stratosphere layer is called the ozonic atmospheric envelope.
11. Temperature reaches 0°C in the upper part of stratosphere layer.
12. • 🕮 The lower part of stratosphere is suitable for flying aeroplanes.
    • Pilots prefer to fly their aeroplanes in stratosphere.
13. Mesosphere layer is called by this name.
14. Mesosphere is the coldest layer.
15. Mesosphere layer is highly rarefied.
16. Luminous meteors are formed in mesosphere layer.
17. The last layer of atmospheric envelope is called thermal layer.
18. The upper part of thermosphere layer is called ionosphere.
19. 🕮 Ionosphere is important for radio stations.
20. Van-Allen Belts play an important role in protecting the Earth.
21. Occurrence of aurora phenomenon.

8. What is meant by ... ?

1. Atmospheric envelope.
2. 🕮 Atmospheric pressure.
3. Normal atmospheric pressure.
4. Isobar.
5. Tropopause.
6. Stratopause.
7. Mesopause.
8. Van-Allen Belts.
9. 🕮 Aurora phenomenon.
10. Exosphere.

9. What's the importance of ... ?

1. Barometers.
2. 🕮 Altimeter.
3. Aneroid.
4. Isobar.
5. Troposphere layer.
6. The lower part of stratosphere.
7. Mesosphere layer.
8. Ionosphere layer.
9. 🕮 Van-Allen Belts.
10. 🕮 Satellites.
11. Exosphere region.

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10. Mention the number representing each of the following :

1. The height of atmospheric envelope.
2. The normal atmospheric pressure.
3. The percentage of water vapour in troposphere layer.
4. The thickness of the stratosphere layer.
5. Temperature at the top of the stratosphere.
6. The thickness of ozone layer.
7. The atmospheric pressure at the top of the mesosphere layer.
8. Temperature at the top of the thermosphere.
9. The height, at which the charged ions are present in ionosphere.

11. What happens in the following cases ?

1. Diving into the depths of the sea [concerning : the pressure on the diving person].
2. Ascending upwards in troposphere [concerning : the temperature and the atmospheric pressure].
3. Descending downwards in stratosphere [concerning : the temperature and the atmospheric pressure].
4. Friction of space rocky masses with air molecules in mesosphere.
5. Harmful cosmic radiations reach the ionosphere.

12. Compare between :

1. Altimeter and aneroid [concerning : their usage].
2. Troposphere and stratosphere layers.
3. Tropopause and stratopause [concerning : the place].
4. Ionosphere layer and exosphere layer [concerning : definition and importance].
5. 🕮 Mesosphere and thermosphere.
   [concerning : temperature, importance and air pressure].

3. Problems :

1. Find the temperature at a point of height 10000 metres above sea level if the temperature at sea level is 24°C.

   _____

2. Find the temperature at a point of height 2000 metres above sea level if the temperature at the sea level is 23°C.

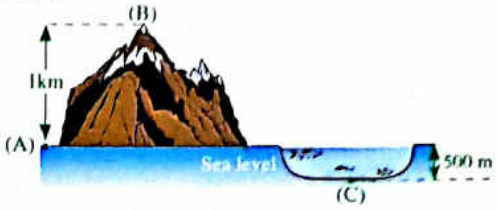
   _____

3. If the temperature at sea level is 24.5°C, find the temperature at the top of troposphere layer if its thickness is 13 kilometres.

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4. 🕮 Calculate the height of a mountain if the temperature at its foot is 30°C and at its top is (– 6°C).

5. From the opposite figure, calculate the temperature at :
   a. Point (B) if the temperature at point (A) = 26.5°C
   b. Point (C) if the temperature at point (B) becomes 10.25°C



14. Variant questions :

(1) 🕮 **Arrange the layers of atmospheric envelope descendingly according to the value of the atmospheric pressure.**

(2) **Arrange ascendingly the following measurements in a table containing the following :**
- Altitude above sea level 9 km , 6 km , 3 km, 12 km
- Temperature at this height – 54°C , – 15°C, 4.5°C , – 34.5°C
- Atmospheric pressure 323 mb , 731 mb , 203 mb, 503 mb

(3) 🕮 **An aeroplane captain announced that the atmospheric pressure outside the aeroplane is 90 millibar.**
In which layer of the atmosphere was the aeroplane flying ? Why ?

(4) **Write brief notes on the relation between rising above the sea level and atmospheric pressure.**

(5) **In two regions on the Earth, we observe bright light curtains in the sky :**
1. What is this phenomenon called ?
2. Why does this phenomenon happen ?
3. Where do we can see this phenomenon ?

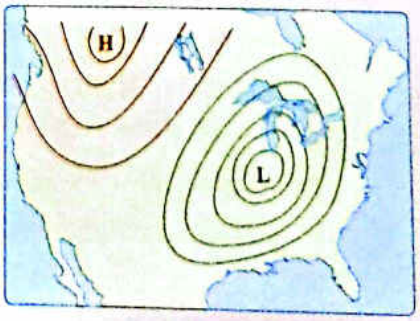
15. Study the following figures, then answer the questions :

(1) **Look at the opposite figures, then answer the following questions :**
1. What is the name of each instrument ?
2. What is the importance of each one ?


(a)


(b)

(2) **The opposite figure represents the atmospheric pressure map. Answer the following questions :**
1. The lines that are present on the map represent .....
2. The symbol "H" on the map represents ....., while the symbol "L" on the map represents .....
3. In which direction does the wind move ?



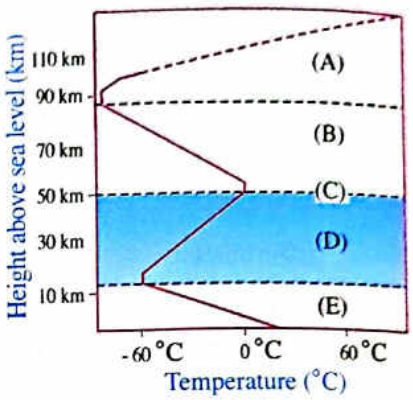
(3) From the opposite figure :

Calculate the height of the building if you know that the temperature which is recorded at the aeroplane = 3°C and the temperature which is recorded at the Earth's surface = 19.25°C.



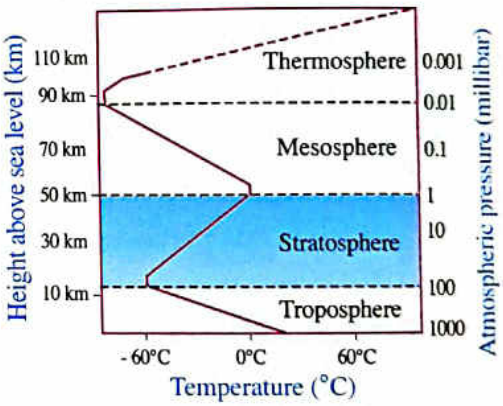
(4) The opposite figure exhibits the temperature changes in the layers of atmospheric envelope :

1. Replace the letters on the drawing with suitable labels.
2. Which layer is .....?
   a. The highest in temperature.
   b. The least in temperature.



(5) The opposite figure exhibits the temperature changes in the layers of atmospheric envelope :

1. Which of the atmospheric layers .....?
   a. is of the highest pressure.
   b. the atmospheric pressure at its end is 1 millibar.
2. Mention the highest and lowest temperature in :
   a. Stratosphere layer.
   b. Mesosphere layer.



(6) The opposite figure represents the two magnetic belts that surround the Earth planet :



1. • What is their scientific name ?
   • Where are they located ?
2. What is the phenomenon that takes place as a result of their existence ?

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Thinking Skills Questions

1. Choose the correct answer :

1. The value of the atmospheric pressure may be equal ..... mbar at the top of El-Mokattam mountain.
   a. 1031.25 b. 1016.25 c. 1013.25 d. 1010
2. ..... of the mass of air is located in a region extends between 3 km and 16 km height.
   a. 10 % b. 40 % c. 50 % d. 90 %
3. The total mass of the air which is located in the upper three layers of the atmospheric envelope is about .....
   a. 99 % b. 75 % c. 50 % d. 25 %
4. Molecules of air are most close to each other at .....
   a. sea surface. b. 1 km height. c. 3 km height. d. 16 km height.
5. In the lower part of the ..... layer, more than half of the mass of the air is located.
   a. thermosphere b. troposphere c. mesosphere d. stratosphere
6. The upper three layers of atmospheric envelope contain ..... of total atmospheric water vapour.
   a. 1 % b. 25 % c. 75 % d. 99 %

2. What happens when ... ?

a. Atmospheric pressure becomes equal at all areas of the Earth.

b. Ionosphere doesn't contain charged particles.

3. If the temperature at the foot of a mountain is 26°C, at which height the snow begins to appear.

4. Calculate the difference in temperature between 2 points (A and B) if their heights above the sea surface is 8 and 10 km respectively.

5. If the temperature at the sea level = 24.5°C, calculate the temperature at a point located below tropopause by 5 km.

6. Heba climbed a mountain with 5 km height and she had a well closed bottle completely full of water, if the temperature at the foot of the mountain is 30°C, what is the temperature at its top, and what will happen to the bottle ? "with explanation".

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7. An aeroplane flying in the sky at a height of 15 km above sea level. If you know that the temperature inside the aeroplane = 20°C and the temperature at the sea level = 35°C.

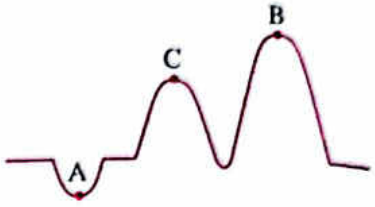
Calculate the difference in temperature between inside and outside the aeroplane.

8. From the opposite figure :

Calculate the height of the point (C) from the point (A).

If you know that :

- The temperature at point (A) = 24°C.
- The temperature at point (B) = 5°C.
- The height of point (B) from point (C) = 2 km.

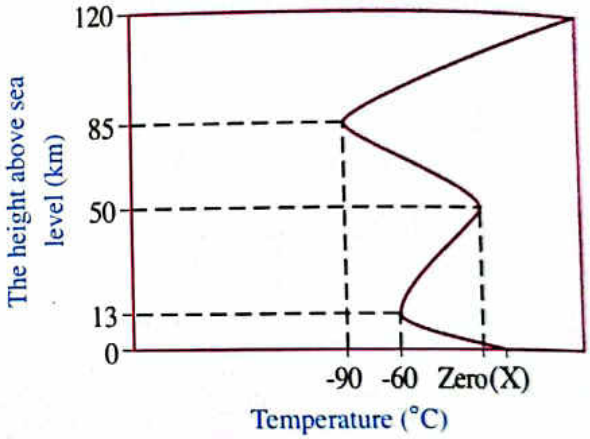


9. From the opposite figure :

(a) Calculate the difference in temperature from the beginning of mesosphere layer to its end.

(b) What is the expected temperature (X) ?

Explain your answer.



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LESSON 2

Erosion of Ozone Layer and Global warming

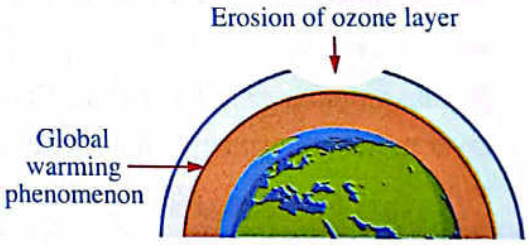


What are the dangers of the industrial development on our life ?

There are two dangerous phenomena that have faced the Earth since the mid twentieth (20^{th}) century. These two phenomena are :

First : Erosion of ozone layer phenomenon (occurs in stratosphere).

Second : Global warming phenomenon (occurs in troposphere).



FIRST Erosion of Ozone Layer phenomenon

Structure of ozone layer

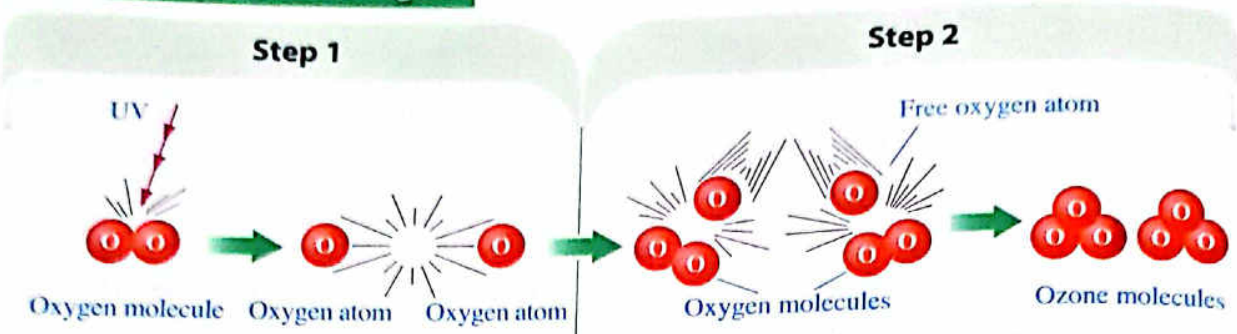
Ozone layer is composed of **ozone gas (O_3)**, which consists of **three oxygen** atoms.



Ozone molecule

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Formation of ozone gas



- Oxygen gas molecule (O_2) absorbs ultraviolet (UV) radiation which causes the break down of its double covalent bond giving two free oxygen atoms (2O).

$$O_2 \xrightarrow{UV} O + O$$

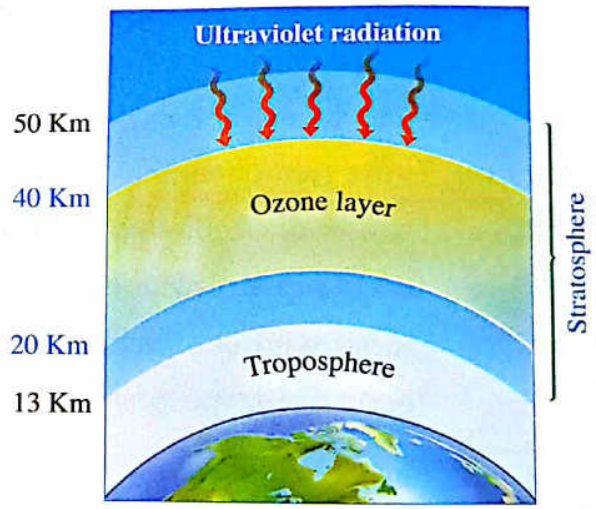
- Each free oxygen atom (O) combines with another oxygen molecule (O_2) forming ozone molecule (O_3).

$$O + O_2 \longrightarrow O_3$$

Location of ozone layer

Ozone layer extends from 20 km to 40 km height above sea level in the stratosphere layer. G.R.

Because stratosphere layer is the first layer in the atmosphere which contains suitable amount of oxygen gas, that faces ultraviolet radiations emitted from the Sun.



Location of ozone layer

Enrichment information

Ozone gas has a faint blue colour and a distinct smell. This can be observed near instruments that contain electric discharge pipes as in the cases of light photographic machines and TV sets.

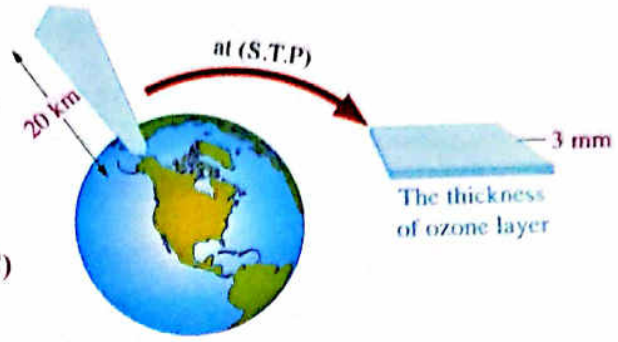
Thickness of ozone layer

- From the previous lesson, you know that the atmospheric pressure and temperature in stratosphere layer are less than the atmospheric pressure and temperature at the sea level, so ozone gas spread forming a layer of **20 km thickness**.

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- The English scientist **Dobson** postulated that the thickness of the ozone layer is compressed into only **3 mm (millimetre)**, if it were subjected to the ordinary temperature and normal atmospheric pressure which is known as (STP).

[STP means standard temperature (0°C) and pressure (1013.25 mbar)].



Accordingly

Dobson assumed that :

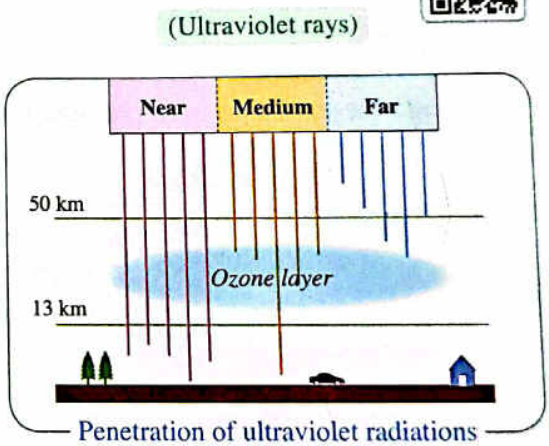
the normal degree of ozone is **300 Dobson** (where each 1 mm thickness is equivalent to 100 Dobson).

Note

The degree of ozone is measured by **Dobson** unit.

Importance of ozone layer

- To know the importance of ozone layer, we should know the types of ultraviolet (UV) rays and their ranges of penetration through ozone layer.



Penetration of ultraviolet radiations through ozone layer

Types of ultraviolet rays

- There are **three types** of UV rays that differ in **wavelength** and **range of penetration** through ozone layer, **As in the opposite figure and the following table :**

	(Ultraviolet rays)		
	Near	**Medium**	**Far**
Wavelength (nanometre) 1 Nanometre (nm) = 1×10^{-9} metre (m)	315 : 400	280 : 315	100 : 280
Range of penetration through ozone layer	**Penetrate** ozone layer by a percentage **100%**	**Don't penetrate** ozone layer by a percentage **95%**	**Don't penetrate** ozone layer by a percentage **100%**
Its effect on living organisms	It is **useful** for the life of living organisms.	It is **harmful** to the life of living organisms.	

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From the previous explanation, we conclude that :

The ozone layer acts as a protective shield for living organisms G.R.

Because it doesn't allow penetration of all far and most of medium ultraviolet radiations, which have harmful chemical effects and threaten the life of living organisms.

Enrichment information

Ultraviolet radiation with wavelength close to the visible light penetrates the atmosphere and reaches the Earth's surface where it helps in synthesis of vitamin (D) in the bodies of the newly born babies.

Erosion of ozone layer

- Since 1978, scientists have noticed that there was erosion of ozone layer **above the south pole of the Earth**. This phenomenon is known as an **ozone hole.**

Ozone hole:

It means thinning or losing parts of ozone layer above the south pole of the Earth.

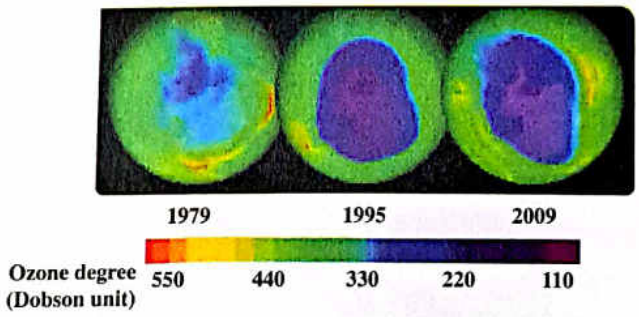
Note

Ozone hole increases in September each year.

Enrichment information

In fall 2001, erosion of ozone layer reached 20×10^6 km^2 which equals twenty times the area of Egypt. In autumn 2008, it reached 27×10^6 km^2 (i.e larger than the area of North America).

The following figure represents the ozone degree during the period [1979 : 2009]



The erosion of ozone layer increases by increasing the area of blue and violet colours.

where,

Green colour	Violet colour
refers to regions, in which the ozone layer is in its normal state (**equals** 300 Dobson).	refers to regions, in which erosion of ozone layer (**lower than** 300 Dobson).

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★ **We can determine the percentage of erosion of ozone layer in a certain area as the following :**

The degree of erosion of ozone layer (in a certain area) = **The normal degree of ozone (300 dobson) – The degree of ozone in this area**

The percentage of erosion of ozone layer (in a certain area) = $\frac{\text{The degree of erosion of ozone layer}}{\text{The normal degree of ozone}} \times 100$

Exercise

TRY to answer worksheet 14 in the Notebook

What is the percentage of erosion of ozone layer in an area, if you know that the degree of its ozone is 150 dobson?

Answer

The degree of erosion of ozone layer in an area = 300 – 150 = 150 dobson.

The percentage of erosion of ozone layer in this area = $\frac{150}{300} \times 100 = 50\%$

Pollutants of ozone layer

1 Chlorofluorocarbon compounds (CFC_s):

They are commercially known as Freon, which is used as :

- A cooling substance in air conditioning sets.
- A propellant substance in aerosols.
- A flating substance in making foam backing.
- A solvent substance for cleaning electric circuits boards.



2 Methyl bromide gas :

It is used as an insecticide to preserve stored agricultural crops.



3 Halons :

They are used in extinguishing fires.



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4 **Nitrogen oxides :**
They are produced from the burning of fuel of ultrasound concorde aeroplanes.

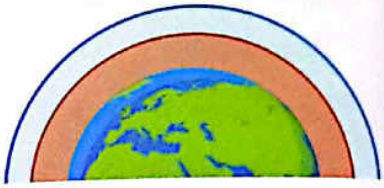


Protecting the ozone layer

- We must reduce the use of chlorofluorocarbon compounds and find safer alternatives.
- We must stop producing the ultrasound concorde aeroplanes.

Second Global Warming phenomenon

Researches of the **IPCC** (*the Intergovernmental Panel on Climate Changes*) that follows UN (*United Nations*) showed that there is an increase in the average temperature of the Earth's near-surface air, which is known as **global warming phenomenon**.

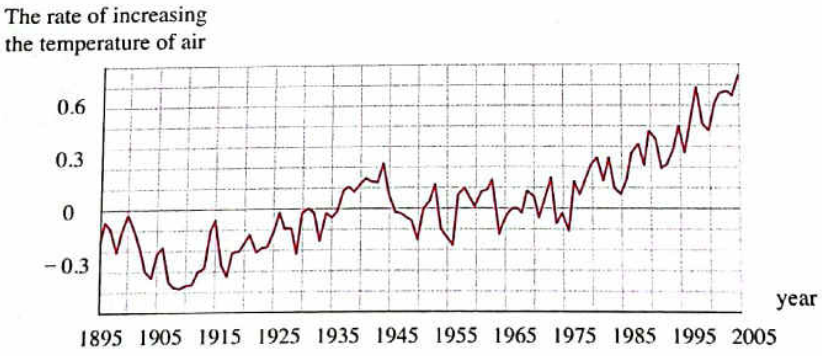


Global warming phenomenon

Global warming phenomenon:

It is the continuous increase in the average temperature of the Earth's near-surface air.

- **The following figure shows the rising of the planet Earth's temperature during the past years.**



Rising of planet Earth's temperature

Reasons for global warming phenomenon

Researches have also shown that the global warming phenomenon is caused by the greenhouse effect.

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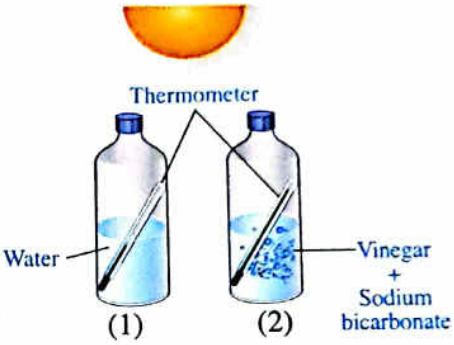
Activity **To know the greenhouse effect :**

Tools :

- 2 empty soda bottles.
- Water.
- 2 thermometers.
- Vinegar.
- Sodium bicarbonate powder.

Steps :

1. Pour some water in bottle (1) and the same amount of vinegar in bottle (2).
2. Insert a thermometer in each bottle.
3. Close bottle (1) and put some sodium bicarbonate powder in bottle (2) and close it immediately.
4. Put both bottles in a sunny place for 10 minutes.



Observations :

- Evolving of gas bubbles in bottle (2).
- Higher reading of the thermometer in bottle (2).

Note

CO_2 gas is produced from the reaction between vinegar and sodium bicarbonate.

Conclusion:

The increase in the concentration of CO_2 gas leads to the increase in temperature.

Similarly :

The temperature of the planet Earth has been increasing since 1935 due to increasing the greenhouse gases (especially CO_2).

* The most important greenhouse gases :

1. Carbon dioxide gas (CO_2).
2. Chlorofluorocarbon compounds (CFC_s).
3. Methane gas (CH_4).
4. Nitrous oxide gas (N_2O).
5. Water vapour (H_2O).

For illustration

The percentage of CO_2 is increased in the atmosphere to 0.038 % in 2005 after it was 0.031%

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⊙ The reasons of increasing the percentage of greenhouse gases in the atmosphere :

1. Fossil fuel burning.



2. Cutting trees.



3. Forests fires.



TRY to answer worksheet in the Notebook 15

Interpretation of the greenhouse phenomenon

When the concentration of greenhouse gases increases in the atmosphere, the atmosphere plays the role of glass in the greenhouse as :

* **In case of presence of normal percentage of greenhouse gases in troposphere :**

- The atmosphere permits the visible light and short-waved rays emitted from the Sun to pass through.
- The Earth and its components absorb these rays and reemit the radiation back in the form of **infrared radiation**.



* **When the rate of greenhouse gases increases in troposphere,** some of infrared radiation cannot penetrate the atmosphere **because it has a long wavelength**.

So it is kept trapped in the troposphere causing the rise in the planet Earth's temperature which is known as **Greenhouse effect**.



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Greenhouse effect:

It is the trapping of infrared radiation in the troposphere layer due to the increase in the percentage of greenhouse gases which cause the increase in the planet Earth's temperature.



Greenhouse effect

Note

The ultraviolet radiation has a **chemical effect**, while infrared radiation has a **thermal effect**.

Enrichment information

Greenhouse gases are considered a blessing which can be changed into a catastrophe, where without these gases, the temperature of the Earth would have decreased to – 18°C and the increase in its concentration in the atmosphere will lead to environmental disasters.

The negative effects of global warming phenomenon

Among the most dangerous consequences of raising the temperature of the Earth planet due to global warming phenomenon are :

1. Melting the snow of the two poles.

2. Severe climatic changes.

1 Melting the snow (ice) of both south and north poles :

Melting the polar ice would increase the level of seas and oceans, which leads to :

1. Disappearance of some coastal areas.
2. Extinction of some polar animals like the polar bear and seals due to the damage of their normal habitate.



Melting masses of snow



Polar bear



Seals

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G.R. ***Global warming phenomenon seriously affects the life on poles.***
Because it causes melting of the snow of both south and north poles which would increase the level of seas and oceans.

2 Severe climatic changes :

Among these features is the repeated occurrence of :

1. **Tropical hurricanes** such as hurricane Katrina in 2005.



2. **Destructive floods.**



3. **Drought waves.**



4. **Forests fires.**



TRY to answer worksheet
- General Exercise of the School Book on Unit 2
- Model exams on Unit 2

in the Notebook

16

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Remember Lesson Two



- Ozone layer extends from 20 km to 40 km above sea level in the stratosphere layer.
- Ozone molecule is composed of three oxygen atoms (O_3).
- At STP, thickness of the ozone layer is compressed into 3 mm according to scientist Dobson.
- Ozone layer acts as a protective shield for living organisms against the harmful chemical effects of ultraviolet radiations.
- **Ozone hole :** Thinning or losing parts of ozone layer above the south pole.
- From pollutants of ozone layer : CFC_s, methyl bromide gas, halons and nitrogen oxides.
- **Comparison between different types of ultraviolet rays :**

	(Ultraviolet rays)		
	Near	**Medium**	**Far**
Wavelength (nanometre) 1 Nanometre (nm) = 1×10^{-9} metre (m)	315 : 400	280 : 315	100 : 280
Range of penetration through ozone layer	**Penetrate** ozone layer by a percentage **100%**	**Don't penetrate** ozone layer by a percentage **95%**	**Don't penetrate** ozone layer by a percentage **100%**
Its effect on living organisms	It is **useful** for the life of living organisms.	It is **harmful** to the life of living organisms.	

- **Global warming phenomenon :** It is the continuous increase in the average temperature of the Earth's near-surface air.
- The most important greenhouse gases :

  CO_2 gas - CFC_s - Methane gas - Nitrous oxide gas - Water vapour.
- **Greenhouse effect :**

  It is the trapping of infrared radiation in the troposphere layer due to increase in the percentage of greenhouse gases, which cause the increase in planet Earth's temperature.
- Ultraviolet radiation has a chemical effect, while infrared radiation has a thermal effect.
- Among the most dangerous effects of global warming phenomenon are :

  - Melting the snow of the two poles.
  - Severe climatic changes.

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Comparison between greenhouse effect and ozone hole :

Points of comparison	Greenhouse effect	Ozone hole
• **Reasons :**	**Increasing the percentage of greenhouse gases in the atmosphere such as :** • Carbon dioxide gas (CO_2). • CFC_s compounds. • Methane gas (CH_4). • Nitrous oxide gas (N_2O). • Water vapour (H_2O).	**The atmosphere contains compounds that pollute the ozone layer such as :** • CFC_s compounds. • Methyl bromide gas. • Halons. • Nitrogen oxides.
• **Harms :**	Increasing the Earth's temperature causing global warming.	Penetration of harmful ultraviolet rays to Earth's surface which threaten the life of living organisms.

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Questions ? on lesson two

Interactive Exercises

• Remember • Understand • Apply ♣ Higher skills (1) School book questions.

1. Choose the correct answer :

1. Ozone layer is located in ..... layer.
   a. troposphere b. stratosphere
   c. mesosphere d. thermosphere
2. Ozone gas molecule consists of .....
   a. four oxygen atoms. b. two oxygen atoms.
   c. three oxygen atoms. d. one oxygen atom.
3. Oxygen molecule splits into two free atoms in the stratosphere layer under the effect of .....
   a. heat. b. infrared radiations. c. ultraviolet radiations. d. cooling down.
4. Scientist ..... proposed that the thickness of ozone layer is about 3 mm under the standard temperature and pressure.
   a. Newton b. Edeson c. Dobson d. Watson
5. (1) Ozone degree is measured in a unit called .....
   a. km. b. Dobson. c. mm^3. d. nm.
6. Degree of ozone at STP is ..... Dobson.
   a. 100 b. 200 c. 300 d. 400
7. One Dobson unit is defined as .....
   a. 3 mm. b. 0.1 mm. c. 0.01 mm. d. 0.001 mm.
8. Ozone layer absorbs .....
   a. infrared rays. b. ultraviolet rays. c. X-ray. d. light rays.
9. The ozone layer does not allow the passage of all ..... ultraviolet rays.
   a. far b. medium c. near d. normal
10. Ozone layer allows 100% of the ..... UV rays to penetrate the Earth's atmosphere.
    a. far b. medium c. near d. normal
11. Nanometre equals ..... metre.
    a. 1×10^{-3} b. 1×10^{-6} c. 1×10^{-9} d. 1×10^{-12}
12. Ozone hole appears over the .....
    a. equator. b. north pole. c. south pole. d. middle east.
13. Ozone hole increases in ..... each year.
    a. December b. September c. January d. October
14. ..... compounds are known commercially as freon.
    a. Halons b. Nitrogen oxides c. Hydrocarbons d. Chlorofluorocarbon
15. All the following are from the uses of chlorofluorocarbon compounds except .....
    a. solvent substance. b. flating substance.
    c. propellant substance. d. heating substance.

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16. ..... is/are used as a coolant in cooling devices.
a. Methyl bromide gas b. Halons
c. Nitrogen oxide d. Freon

17. ..... is/are used in extinguishing fires.
a. Methyl bromide gas b. Halons
c. Nitrogen oxides d. UV radiations

18. All of the following cause erosion of ozone layer except .....
a. freon. b. aerosols. c. nitrogen oxides. d. iron oxides.

19. ..... is/are used as an insecticide to preserve stored agricultural crops.
a. Methyl bromide gas b. Halons
c. Nitrogen oxide d. Freon

20. ..... result(s) from the burning of fuel of ultrasound concorde aeroplanes.
a. Methyl bromide gas b. Halons
c. Nitrogen oxide d. Freon

21. Greenhouse effect explains .....
a. erosion of ozone layer. b. global warming phenomenon.
c. a new way of agriculture. d. water evaporation.

22. 📖 All of the following gases are greenhouse gases except .....
a. CO_2 b. O_2 c. N_2O d. CH_4

23. All the following reasons are causing of global warming except .....
a. increase in carbon dioxide in the atmosphere.
b. decrease in carbon dioxide in the atmosphere.
c. cutting trees.
d. forest fires.

24. All the following are negative effects of global warming except .....
a. melting the ice at the north pole.
b. severe climatic changes.
c. the lack of ozone gas in the atmospheric envelope.
d. melting the ice at the south pole.

25. ..... is/are among the reasons for increasing CO_2 gas percentage.
a. Watering the land b. Cutting trees only
c. Forests fires only d. Cutting trees and forests fires.

26. ..... radiation is characterized by thermal effect.
a. Infrared b. Ultraviolet
c. Visible light d. X-ray

27. ..... is from the animals that will extinct due to the melting of ice in the north and south pole (as a result of global warming).
a. Polar bear b. Blue whale c. Mammoth d. Squirrel

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2. Choose from column (B) what suits it in column (A) :

(1)

(A)	(B)
1. The thickness of ozone layer in the stratosphere layer is	a. 95%
2. The thickness of ozone layer at STP is	b. 20 km
3. The percentage of near UV radiations that are absorbed by the ozone layer is	c. 40 km
4. The percentage of medium UV radiations that don't penetrate ozone layer is	d. 3 mm
	e. 0%

(2)

(A)	(B)
1. Freon is used in	a. extinguishing fires.
2. Methyl bromide is used in	b. making foam boxes.
3. Halons are used in	c. iron industry.
	d. insecticides.

(3)

(A)	(B)
1. Methane gas	a. H_2O
2. Water vapour	b. CO_2
3. Nitrous oxide gas	c. CH_4
4. Carbon dioxide gas	d. CFC_s
5. Chlorofluorocarbon compounds	e. NO_2
	f. N_2O

3. Put (✓) or (×) and correct the wrong ones :

1. Ozone layer is found in the stratosphere layer. ( )
2. Ozone molecule is formed by the bonding of two oxygen atoms. ( )
3. The ozone layer extends from 20 to 30 km above sea level. ( )
4. Ultraviolet radiation splits the ozone molecule into two atoms. ( )
5. Millibar is the unit of measuring the ozone degree. ( )
6. Nanometre (nm) = 1×10^9 m. ( )
7. The ozone layer allows the passage of all near and medium ultraviolet rays. ( )
8. The ozone layer acts as a protective shield for living organisms. ( )
9. Nitrogen oxides are among pollutants that affect the ozone layer. ( )
10. Freon is used as a coolant in cooling devices. ( )
11. Methyl bromide gas is used as an insecticide. ( )
12. Nitrogen oxides result from fuel burning of ultrasound aeroplanes. ( )
13. Halons are produced from fuel burning of supersonic aeroplanes. ( )
14. The ozone layer erosion differs in size every year. ( )

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15. The increase in carbon dioxide gas percentage in the atmospheric envelope leads to the increase in the Earth's temperature. ( )
16. Decreasing of plants on the Earth leads to the increase in its temperature. ( )
17. Infrared radiation can't penetrate the atmosphere because of its short wavelength. ( )
18. Methane gas and nitrous oxide are considered as greenhouse gases. ( )
19. CFC_s compounds are from the causes of ozone hole and global warming. ( )
20. Extinction of some polar animals is one of the negative effects of global warming phenomenon. ( )
21. From the negative effects of climatic changes are the happening of tropical hurricanes, destructive floods, drought waves and forests fires. ( )

4. Write the scientific term of each of the following :

1. A molecule is formed by combining an atom of an element with molecule of the same element.
2. A gas which is important for building ozone gas.
3. A kind of radiations that can break down oxygen molecule forming free oxygen atoms.
4. The atmospheric layer, in which ozone layer is formed.
5. A unit used for measuring ozone degree.
6. An atmospheric layer that acts as a shield which protects living organisms from the danger of ultraviolet radiation.
7. A type of ultraviolet radiations that is absorbed completely (100%) by the ozone layer.
8. A type of ultraviolet rays that is absorbed by a percentage 95% by ozone layer.
9. A type of ultraviolet rays that penetrates the ozone layer by a percentage 100%
10. Kinds of rays that cause harmful effects to living organisms.
11. Thinning or losing parts of ozone layer above the south pole.
12. A chemical compound used as a cooling material in air conditioning sets and refrigerators.
13. A gas used as an insecticide and causes the increase in ozone hole.
14. Compounds used in extinguishing fires and considered from the most dangerous pollutants of ozone layer.
15. Oxides that cause ozone hole and result from burning of the fuel of concorde planes.
16. The continuous increase in the average temperature of the air near the surface of the Earth.
17. Gases when their percentages increase, the temperature of the planet Earth increases.
18. One of the atmosphere components that its ratio increased in recent years to reach about 0.038%
19. A kind of radiations that causes the rise in temperature in troposphere layer.
20. Trapping of infrared radiation in troposphere layer due to the increase in the percentage of greenhouse gases which leads to the increase in the planet Earth's temperature.

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5. Complete the following statements :

1. ..... and ..... are the two most dangerous phenomena that face the Earth's atmosphere.
2. Ozone layer extends from ..... to ..... km above sea level.
3. The ozone layer is located in the stratosphere which contains a suitable amount of ..... gas, and its thickness is about ..... km.
4. ..... is formed by the combination of three active oxygen atoms.
5. Ozone gas is formed in two steps which are :

   (a) $O_2 \xrightarrow{UV} O + ...$ (b) $O + ... \longrightarrow O_3$
6. The thickness of ozone layer is about ..... mm or equals ..... Dobson at the standard temperature and pressure.
7. The ultraviolet rays are three kinds which are ..... , ... and ..... ultraviolet rays.
8. The nanometre equals ..... metre.
9. Ozone layer allows penetration of all ..... ultraviolet rays and absorbs most of ..... ultraviolet rays.
10. The erosion of ozone layer above the ..... pole increases in the month of ..... every year.
11. CFC_s compounds are commercially known as ..... and they are used in .....
12. 🕮 Among the pollutants of ozone layer are ..... compounds that are used in air conditioning sets and ..... compounds that are used in fire extinguishers.
13. ..... is used as insecticide to preserve the stored agriculture crops.
14. ..... oxides are produced from burning of the fuel of supersonic aeroplanes (concorde).
15. The global warming phenomenon means .....
16. Among the reasons for increasing CO_2 gas percentage in the atmosphere is burning of ..... and .....
17. The most known greenhouse gases are ..... , CFC_s , ... and nitrous oxide.
18. The glass permits the passage of ..... and ..... rays coming from the Sun to be absorbed by Earth in the greenhouse.
19. ..... radiation is trapped in troposphere layer, because this kind of radiation has ..... wavelength.
20. 🕮 Ultraviolet radiation has a ..... effect, and infrared radiation has a ..... effect.
21. ..... and ..... are among negative effects of global warming phenomenon.
22. ..... and ..... are considered from the negative effects of the climatic changes resulting from global warming.

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6. Give reasons for :

1. Formation of ozone layer in the stratosphere layer.
2. The ozone layer acts as a protective shield for living organisms.
3. Increasing the size of ozone hole in September every year.
4. Chlorofluorocarbon compounds are dangerous to the environment.
5. Factories should stop their production of foam boxes.
6. Scientists decrease using freon as a cooling material.
7. Stop producing concorde aeroplanes.
8. Increasing the average temperature of the Earth's near-surface air during the last years.
9. Increasing in CO_2 gas percentage in the atmosphere.
10. Infrared radiation cannot penetrate the Earth's atmosphere.
11. Naming global warming phenomenon by greenhouse effect.
12. The global warming phenomenon has negative effects on Earth.
13. Most countries are attempting to reduce the use of fossil fuel.

7. What is meant by ... ?

1. Dobson.
2. STP
3. Ozone hole.
4. CFC_s
5. IPCC
6. Global warming phenomenon.
7. Greenhouse gases.
8. Greenhouse effect.

8. What do the following numbers indicate ... ?

1. Three oxygen atoms.
2. 280 : 315 nm.
3. 1×10^{-9} m.
4. A layer of 20 km thickness in stratosphere layer.
5. 300 Dobson.

9. What is the importance of ... ?

1. Ultraviolet radiations.
2. Ozone layer.
3. Chlorofluorocarbon compounds.
4. Methyl bromide gas.
5. Halons.

10. Give an example of each of the following :

1. Dangerous pollutant causes depletion of ozone layer.
2. Greenhouse gases.
3. One of the severe climatic changes.

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11. Explain the role of :

1. Ultraviolet radiation in the formation of ozone gas.
2. CO_2 in global warming phenomenon.
3. Infrared radiation on global warming.

12. Choose the odd word out and link the rest in meaningful statements :

1. Nitrogen oxides - Water vapour - Freon - Halons.
2. Cooling instruments - Cleaning electronic slides - Extinguishing fires - Aerosols propellers.
3. Methyl bromide - Carbon dioxide - Water vapour - Methane gas.
4. Destructive floods - Forests fires - Drought waves - Greenhouse effect.

13. What would happen when ... ?

1. Ultraviolet radiation hits oxygen molecules.
2. Oxygen atom combines with oxygen molecule.
3. Existence of ozone in conditions of standard temperature and pressure (STP).
4. Overuse of methyl bromide gas as an insecticide.
5. Increasing in the percentage of nitrogen oxides in the atmospheric envelope.
6. Overuse of freon.
7. Erosion of ozone layer over an area.
8. Increasing in the percentage of greenhouse gases in the atmosphere.
9. Infrared radiations don't reemit back from troposphere layer.
10. Melting the snow of south and north poles.
11. Earth's temperature increases [concerning : the climatic changes].
12. The continuous increase in consumption of fossil fuel.

14. Compare between :

1. Oxygen molecule and ozone molecule.
   [concerning : structure - the effect of ultraviolet radiations on each of them].
2. Far ultraviolet radiations and near ultraviolet radiations.
   [concerning : the percentage which penetrates ozone layer - the wavelength].
3. Greenhouse effect and ozone hole.
   [concerning : causes - harms].

15. Variant questions :

(1) "Ozone layer is found in the stratosphere layer. It is important to protect the life of organisms".

1. What is the average thickness of ozone layer in the atmosphere?
2. What is the only element that forms ozone gas?

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3. **Complete :**
   a. Ozone layer protects the Earth from the harmful effects of ..... radiation.
   b. The thickness of ozone layer at STP is .....
4. **Put (✓) or (✗) :**
   Ozone layer prevents penetration of all types of UV radiation. ( )

(2) Illustrate with formulae only, the role of ultraviolet radiation in the formation of ozone gas.

(3) "The erosion of ozone layer is a phenomenon occurred by many pollutants". Answer the following questions :

1. What are the most dangerous pollutants of ozone layer?
2. What is the commercial name of CFC_s compounds?
3. What are the oxides produced from the burning of fuel of concorde aeroplanes?
4. Mention the ways by which ozone layer can be protected.

(4) "Researches of the Intergovernmental Panel on Climate Changes showed that there is an increase in the average temperature of Earth's near-surface air"

1. What is the name of this phenomenon?
2. What is the factors that help in making it worse?
3. How does this phenomenon threaten the life of polar animals?

(5) Write short notes about :

1. The negative results of global warming phenomenon.
2. Greenhouse effect.

(6) Calculate the percentage of erosion in ozone layer in a certain area, knowing that ozone degree at this area is 255 dobson.

(7) Earth's weather is exposed to many climatic changes :

1. Mention examples about these climatic changes.
2. What is the reason for causing of these climatic changes ?

16. Study the following figures, then answer the questions :

(1) Which of the opposite figures represents:

1. an oxygen atom.



Fig. (a)

2. an ozone molecule.



Fig. (b)

3. an oxygen molecule.

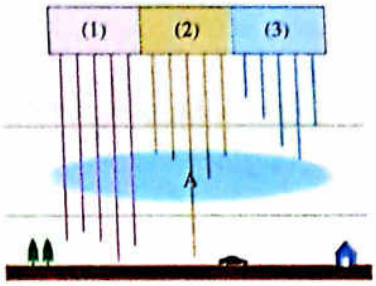


Fig. (c)

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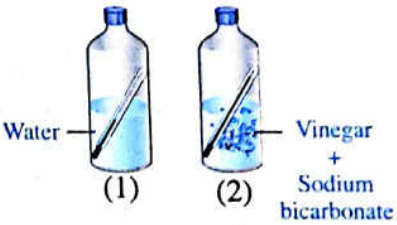
(2) Study the opposite figure, then answer :

1. What do the rays (1) , (2) and (3) represent ?
2. Which of these rays (1) , (2) or (3) has the longest wavelength ?
3. What does the area (A) indicate ? What is its thickness ? And where does it locate ?
4. Mention some compounds affect on the area (A).



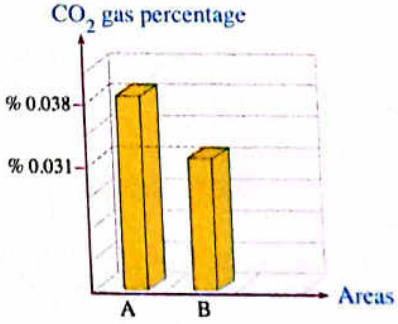
(3) Study the opposite figure, then answer :

1. What is the evolved gas from bottle (2) ?
2. In which bottle the temperature increases ? Why ?



(4) The opposite figure represents the percentage of carbon dioxide gas in two different areas, then answer :

1. In which area do you prefer to live ? Why ?
2. What is the phenomenon resulted from increasing the concentration of carbon dioxide gas in nature ?



(5) Study the opposite figure , then answer :

1. What does this figure represent?
2. What is the relation between greenhouse effect and global warming phenomenon ?
3. What is the type of radiation that is reflected back from the land ?



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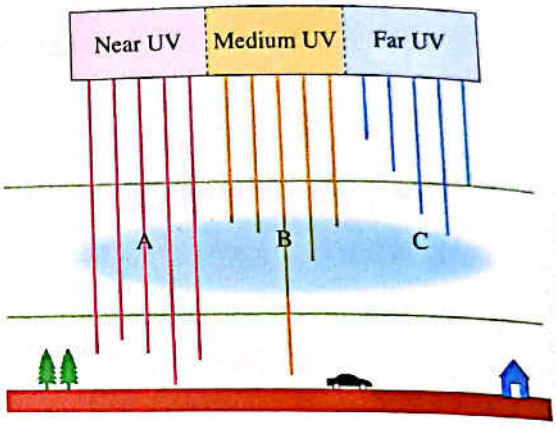
Thinking Skills Questions

1. Explain how planting green plants on the roof of the building affect the global warming phenomenon.

2. In the opposite figure :

a. What is the percentage of absorbed ultraviolet in the area symbolized by (C) ?

b. What is the cause of the ability of penetration the near UV rays to the ozone layer ?

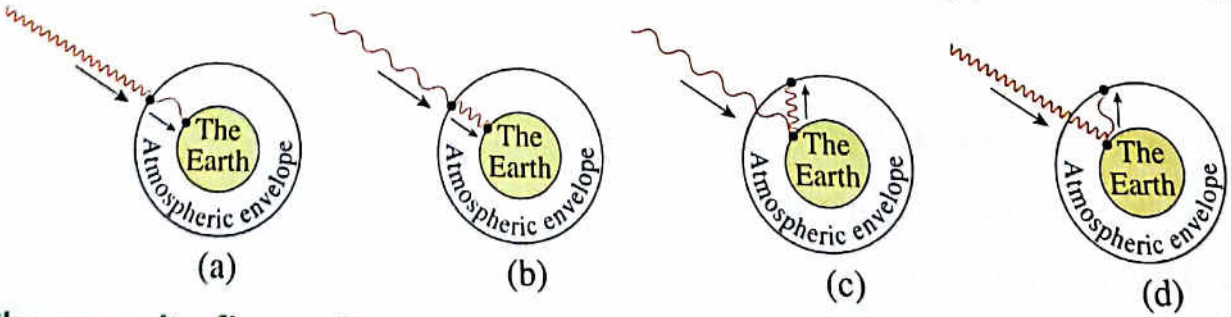


3. Complete :

If the percentage of erosion of ozone layer in a certain area equals 75%, this means that the degree of ozone in this area equals ..... Dobson.

4. From the opposite key : Visible light | Infrared radiation | Absorbed energy

Which one from the following figures represents the global warming phenomenon ? .....



5. The opposite figure shows a person in a car with closed windows :

1. Replace the letters (A & B) with suitable labels.
2. What is the process expressed by this figure?



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Project
On UNIT TWO



A project to develop the critical thinking
"Attention to other perspectives"

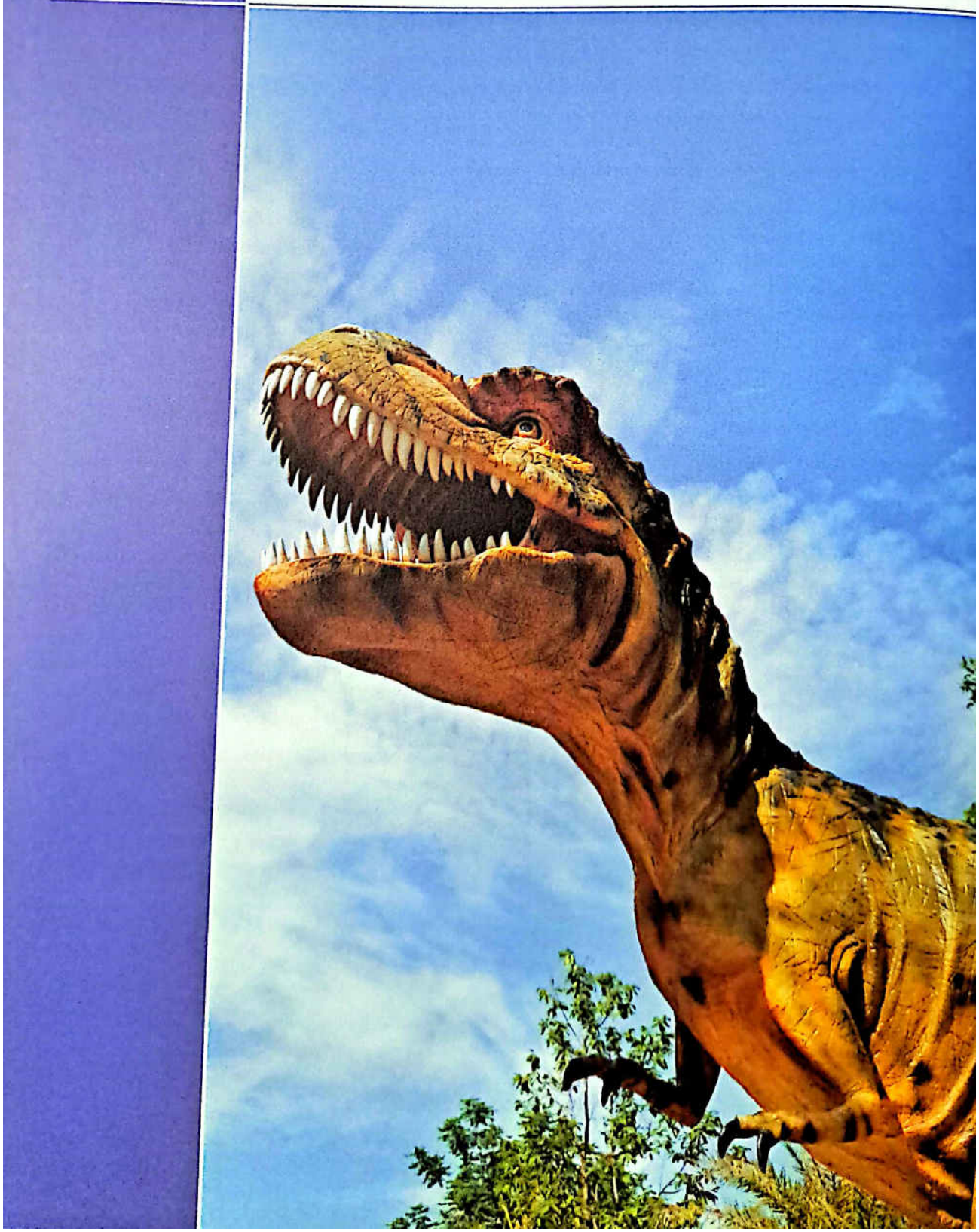
*** Mention one point of view for approved persons and another for opposing persons for each of the following cases :**

1. Some persons believe that it is necessary to use insecticides, while others believe that it is necessary to limit their uses.
2. Some persons believe that ultraviolet rays are useful, while others believe that they are harmful.
3. Some persons believe that the troposphere and mesosphere layers are similar, while others believe that they are different.
4. Some persons believe that the aneroid and altimeter are similar, while others believe that they are different.
5. Some persons believe that the air of troposphere layer is similar to the air of stratosphere layer, while others believe that they are different.
6. Some persons believe that it is better to use a metre to measure lengths, while others believe that it is better to use nanometre.
7. Some persons believe that freon have benefited humanity, while others believe that they have harmed humanity.
8. Some persons believe the importance of greenhouse gases in the air, while others believe the danger of their presence.
9. Some persons believe that satellites are supportive of human rights, while others believe that they restrict human rights.
10. Some persons believe that the erosion of ozone layer will increase by passing time, while others believe that it will decrease by passing time.

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UNIT 3

Fossils and Protecting Species from Extinction



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Lesson 1	Fossils.
Lesson 2	Extinction.

Unit Objectives :

By the end of this unit, students will be able to :

- Recognize the concept of fossil.
- Give different examples of fossils.
- Infer the types of fossils.
- Explain the ways of fossils formation.
- Design a mold of a candle.
- Design models of cast and mold.
- Compare between types of fossils.
- Mention the importance of studying fossils.
- Calculate the age range of some fossils.
- Appreciate the importance of the discovery of fossils in the service of man, environment and society.
- Establish a vision to take responsibility and take personal decisions to protect fossils.
- Collect data and information and expressed their opinion in the protection of fossils and their scientific and social importance.
- Use research skills and inquiry in the study of fossils.
- Define the concept of extinction.
- Use fossils to indicate extinction of some types of organisms.
- Conclude the factors that cause extinction of some types of living organisms.
- Give examples of extinct and endangered species.
- Understand the effect of extinction on ecological equilibrium.
- Suggest new solutions to protect living organisms from extinction.
- Deal gently with organisms and in a civilized manner with the environment.
- Act consciously with the environment and appreciate the importance of normal life.
- Appreciate the role of scientists in protecting living organisms from extinction.
- Use life skills in the study of extinction and protection of living organisms from extinction.
- Write a scientific report on the causes of extinction of some organisms.
- Continue and express their views and discuss with their colleagues and the teacher about ways to protect living organisms from extinction.
- Appreciate the greatness of God in the creation of living organisms.

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LESSON 1

Fossils



How can you study life evolution on the planet Earth ?

If you organize a trip to the Geological museum at the River Nile bank in Zahraa El Maady, you will observe the presence of fossils there.

In this lesson, we will study :

- Concept of fossils.
- Types of fossils and their formation.
- Importance of fossils.



Concept of fossils

- Fossils are considered as an exciting world (a story told by sedimentary rocks), that tell us about the deep past, millions years ago even before the creation of man on the Earth.

Fossils:

They are traces and remains of old living organisms that are preserved in sedimentary rocks.

- **What is the meaning of traces and remains ?**

Trace:

Traces of an old living organism indicate its activity during its life.

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* Examples :

Worms' tunnels



Dinosaur's foot print



Remains:

Traces that indicate the remains of an old living organism after death.

* Examples :

Remains of a shark's teeth



Remains of a dinosaur's skull



Enrichment information

- *In Latin, the word fossil means something buried in the Earth.*
- *The science, which studies fossils is called "Paleontology".*

Types of fossils

Fossils are classified according to the way of formation (or preservation) into several types, among them are :

1. Fossil of a complete body
2. Mold
3. Cast
4. Petrified fossils

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1 Fossil of a complete body

- It is a type of fossils, which was formed as a result of the rapid burying of the organism as soon as it died in a medium that preserves it from decomposition as **snow** or **amber**.

A complete body fossil :

It is a fossil that keeps the whole shape and all the details of the body of the living organism as a result of its rapid burying as soon as it died in a medium that preserves it from decomposition.

*** Examples of a complete body fossil :**

A Mammoth fossil :

- Mammoth (a type of elephants) was extinct by the snow avalanche occurred in Siberia 25000 years ago.
- The **first mammoth fossil,** which was discovered last century, and it keeps the whole shape, hair, flesh and food in its bowel.

B Amber fossil :

- During some old geologic ages, there were common ***pine trees***, which secreted **resinous matter** that changed after its solidification into amber.

Amber:

It is the solidified resinous matter, which was secreted by pine trees in old geologic ages.

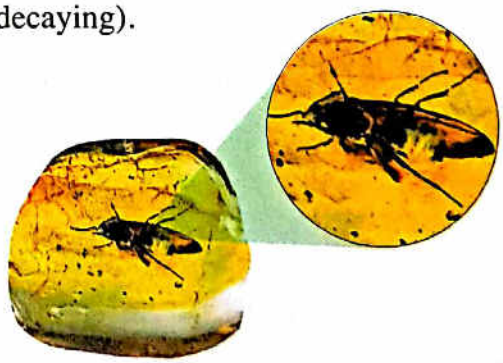
Way of formation :

- After its death, mammoth rapidly buried in **snow** which preserved its body from decomposition.



Mammoth fossil

- Insects were covered by the resinous matter which solidified and changed into **amber** that preserved the bodies of insects buried inside it from decomposition (decaying).



Amber fossil

G.R. ***Amber is considered as a suitable medium for the formation of complete body fossils.***
Because it preserved the bodies of insects inside it from decomposition.

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2 Mold

In the opposite figure :

The face pattern that carries the internal details of a face mask is known as a mold.



A mold for a face mask

- Before studying the mold fossils, we must know how to make a model of a solid mold.

Activity 1 Making a model of a solid mold :

Materials and tools :

- Plaster of paris.
- Water.
- Brush.
- Food oil.
- Plastic container.
- Metal mold (or a silicon mold).
- Rod for stirring.

Procedures	Figure	Observation
1. Paint the internal surface of the metal mold (or the silicon mold) with oil using the brush.		- The details formed on the surface of the plaster are the same details of the internal surface of the metal mold.
2. Mix plaster of paris with water and continue stirring to make suitable mixture.		
3. Pour the mixture in the metal mold and wait until the plaster of paris solidifies.		
4. Separate the hard mixture from the metal mold.		

Conclusion:

A replica of the internal shape of metal mold is formed and it is known as **"Solid mold"**.

-Solid mold fossil:

It is the replica of the internal details of the structure of an old living organism left after its death in sedimentary rocks.

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* **Examples of solid mold fossils :**

Ammonites fossil



Nummulites fossil

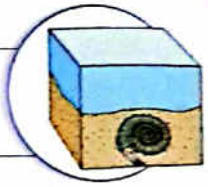


Trilobite fossil

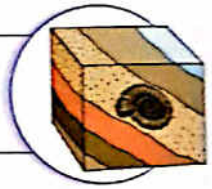


How is the solid mold fossil formed ?

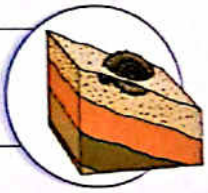
1 When a snail (or clam) dies, it falls on the sea floor, where its soft parts decompose leaving the shell which is buried in sediments.



2 The sediments fill up the shell cavities and solidify as the time passes.



3 The shell decomposes completely, leaving a solid rock mold carrying the internal details of the snail.



Real Life application : *A Candle mold*

- Melt a piece of paraffin wax or wax remains in a water bath.
- Roll a piece of strong paper in the form of a cylinder, then put it in an empty yoghurt can, then pass a thick thread through the cylinder using a needle.
- Pour the melted wax in the cylinder keeping the thread in the middle all time.
- Remove the paper from around the wax after its solidification and put the candle in a suitable glass saucer.



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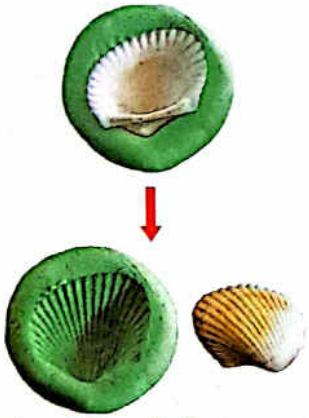
3 Cast

To know what is meant by cast, we must carry out the following activity :

Activity 2 **Making a model of cast :**

Materials and tools :

- Coloured clay.
- A shell of clam.

Procedures	Figures	Observation
1. Press on the clay by your hand to make a plane surface.	 A cast for a shell	- The details formed on the clay are the same details of the external surface of shell.
2. Put the shell on the surface of the clay and press it gently.		
3. Remove the shell from the clay.		

Conclusion:

A replica of the original external shell shape is formed and it is known as "**Cast**".

Cast fossil :

It is the replica of the external details of the structure of an old living organism left after its death in sedimentary rocks.

*** Examples of cast fossils :**

Cast of ferns



Fish cast



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Note

In the sedimentary rocks, mold or cast can be formed for an old living organism after its death.



Trilobite fossil

Comparison between a mold and a trace :

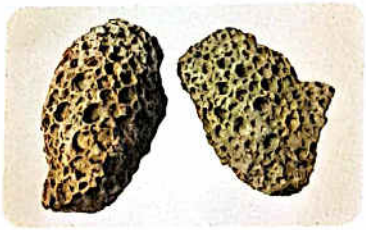
Mold	Trace
- It is the replica of the internal details of the structure of an old living organism leaving them in the sedimentary rocks after death. **Ex.:** Ammonites fossil.	- Traces that indicate an activity of an old living organism leaving them in sedimentary rocks during its life. **Ex.:** Dinosaur's foot print.

Question

Choose the correct term (cast - mold - trace) of each of the following fossils :



1. Fossil ..... of ferns.



2. Fossil ..... of worms' tunnels.



3. Fossil ..... of trilobite.

4 Petrified fossils

Petrified fossils:

They are fossils in which minerals replace the organic matter of an old living organism, after its death, part by part leaving the shape without any change.

Petrification:

It is the process of conversion of the parts of old living organisms to rocky materials as a result of replacing the organic material of the organism with minerals, part by part.

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* Examples of petrified fossils :

Petrified dinosaur's tooth



Petrified dinosaur's eggs



Petrified wood



Petrified woods:

They are fossils which are formed as a result of replacing the wood material of trees with minerals, part by part, giving us details about the life of an old plant.

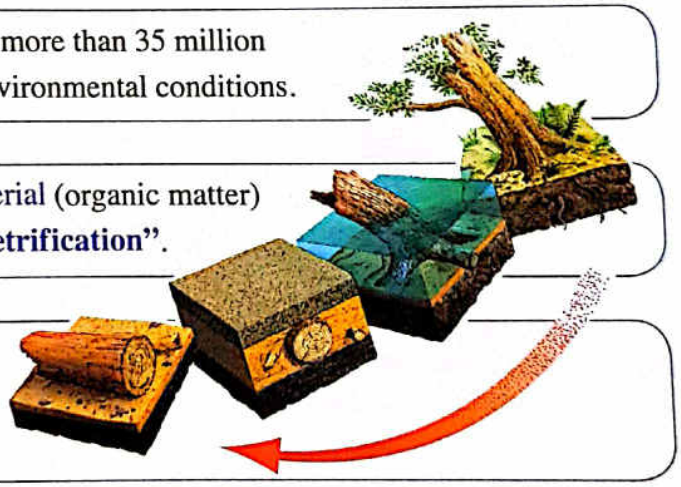


How is the petrified wood formed ?

1 The stems and trunks of trees that are more than 35 million years of age were buried in certain environmental conditions.

2 The minerals replaced the wood material (organic matter) part by part, and this is known as **"Petrification"**.

3 By passing time, the wood changes into rocks, which carry the same details of wood without change.



G.R. ***Petrified woods are considered as fossils although they look like rocks.***
Because they give us the details about the life of an old plant.

Note

The area of petrified forests in Qattamiya is called the wood mountain G.R.
Because it contains petrified woods, which look like rocks.

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Enrichment information

An Egyptian dinosaur has been discovered in Bahariya Oasis, Giza governorate and parts of it are being displayed in the Egyptian Geological Museum.

Suitable conditions for fossils formation (or preservation) :

First

Presence of hard skeleton of organism.

Second

The body of the organism must be buried immediately after death in a medium that preserves it from decomposition.

Third

The existence of a suitable medium, in which the mineral material of rocks replaces the organic material of the living organism.

TRY to answer worksheet 17 in the Notebook

Importance of fossils

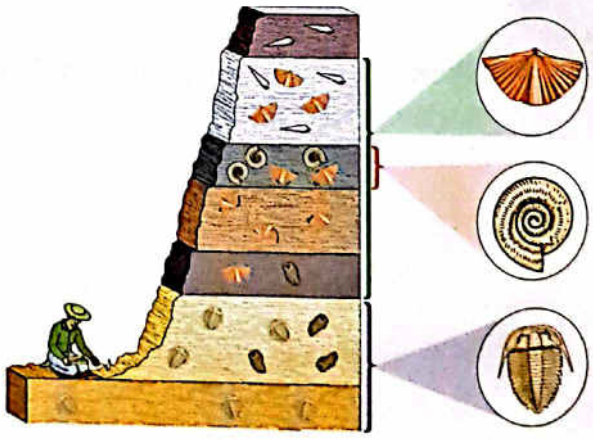
Fossils are important, because they help in :

1. Age determination of sedimentary rocks
2. Figuring out the paleoenvironment
3. Studying life evolution
4. Petroleum exploration

1 Age determination of sedimentary rocks

The scientists notice that :

The lower layers of sedimentary rocks have fossils, whose relative age is greater than that of the fossils of the upper layers, these fossils are known as index fossils.



Index fossils:

They are fossils of organisms that had lived for a short period of time in the past and had a wide geographical range distribution, then became extinct.

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G.R. | ***Index fossils indicate the age of sedimentary rocks existed in them.***
Because the age of rocks is the same age of fossils existed in them.

2 Figuring out the paleoenvironment

Fossils give us an idea about the environment, in which they lived during the old geologic ages, therefore they indicate the climate of these ages.

* **Examples :**

1 **Nummulites fossils :**
They are found in the limestone rocks of El-Mokattam mountain and they indicate that this area was a sea floor more than 35 million years ago.



2 **Ferns fossils :**
They indicate that the environment, where they lived was a hot and rainy tropical environment.



3 **Coral fossils :**
They indicate that the environment, where they lived was clear warm shallow seas.



Question

Put (✓) or (✗) :

1. Ammonites fossils are found in the limestone rocks of El-Mokattam mountain. ( )
2. Index fossils indicate the age of sedimentary rocks. ( )
3. Ferns fossils indicate that the environment where they lived was a sea floor. ( )

Give reason for :

Index fossils are called by this name.

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3 Studying life evolution

Fossil record:

The sequence of fossils in sedimentary rocks layers according to their sequence of appearance from simple to complicated.

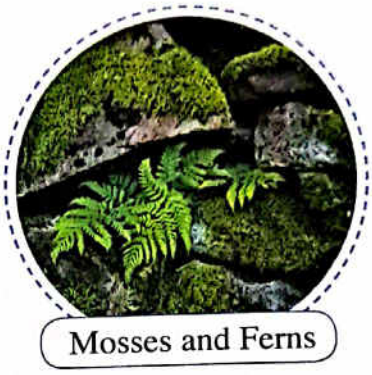
Studying the fossil record showed that :

1. Life started first in sea then established on land.
2. Organisms always developed from simple to complicated.

A In plant world

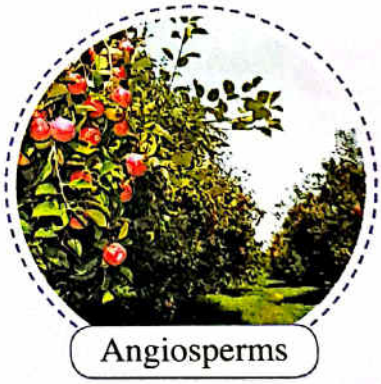

Algae

appeared before


Mosses and Ferns


Gymnosperms

appeared before


Angiosperms

Question

Complete the following statements :

1. By studying the fossil record, it shows the ..... started first in ..... then established on .....
2. ..... had appeared before ferns, while gymnosperms appeared before ..... plants.

- ***Write the scientific term of each of the following :***

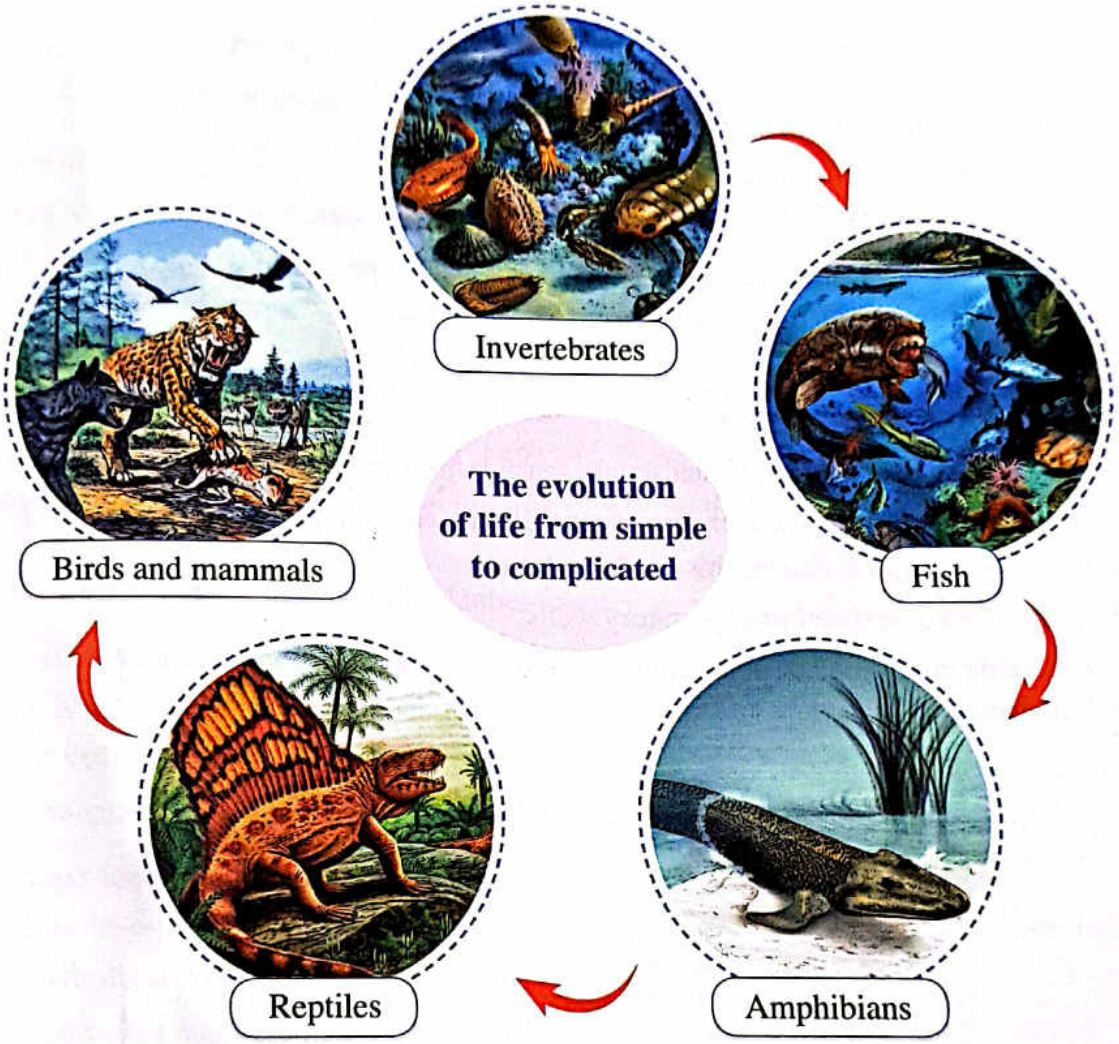
1. Fossils of organisms that had lived for a short period of time in the past and had a wide geographic distribution.
2. Fossils indicate that the environment where they lived was clear warm shallow seas.

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B In animal world

- **Invertebrates** like (corals and mollusks with shells) appeared before **vertebrates.**
- **Fish** were the first vertebrates that appeared followed by **amphibians** then **reptiles** and finally, **birds and mammals** appeared together.

* **As in the following figure :**



Note

Archaeopteryx fossil is considered a link between reptiles and birds.



Archaeopteryx fossil

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Exercise

- ***Arrange the following fossils starting with first appearance on the life stage and explain your answer.***

[Cast fossil of fish - Mammoth fossil - Trilobite fossil - Archaeopteryx fossil]

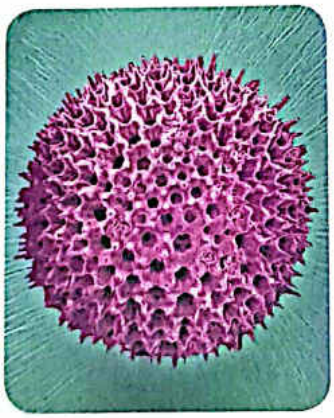
Answer

Trilobite fossil → Cast fossil of fish → Archaeopteryx fossil → Mammoth fossil

- **Trilobite** is from invertebrates that appeared in seas.
- **Fish** were the first vertebrates that appeared.
- **Archaeopteryx** links between reptiles and birds which appeared after fish.
- **Mammoth** is from the mammals that appeared after reptiles.

4 Petroleum exploration

- When searching for petroleum, geologists take samples from the rocks of the exploratory wells.
- These samples are studied under microscope. If they contain microfossils like **foraminifera** and **radiolaria, this could point to :**
  - The age of rocks existed in exploratory wells.
  - The suitable conditions of petroleum formation.



Enlarged foraminifera fossil



Enlarged radiolaria fossil

TRY to answer worksheet 18 in the Notebook

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Remember Lesson One



Fossils :

They are traces and remains of old living organisms that are preserved in sedimentary rocks.

Trace :

Traces of an old living organism indicate its activity during its life.

Examples : Worm's tunnels – Dinosaur's foot print.

Remains :

Traces that indicate the remains of an old living organism after death.

Examples : Remains of a shark's teeth – Remains of a dinosaur's skull.

Types of fossils are :

(A) A complete body fossil :

It is a fossil that keeps the whole shape and all the details of the body of the living organism as a result of its rapid burying as soon as it died in a medium that preserves it from decomposition.

Examples : Mammoth fossil - Amber fossil.

(B) Solid mold fossil :

It is the replica of the internal details of the structure of an old living organism left after its death in sedimentary rocks.

Examples : Ammonites fossil – Nummulites fossil – Trilobite fossil.

(C) Cast fossil :

It is the replica of the external details of the structure of an old living organism left after its death in sedimentary rocks.

Examples : Cast of ferns – Fish cast.

(D) Petrified fossils :

They are fossils in which minerals replace the organic matter of an old living organis after its death, part by part leaving the shape without any change.

Examples : Petrified dinosaur's tooth and eggs – Petrified wood.

Petrified woods :

They are fossils which are formed as a result of replacing the wood material of trees wit minerals, part by part, giving us details about the life of an old plant.

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Petrification :

It is the process of conversion of the parts of old living organisms to rocky materials as a result of replacing the organic material of the organism with minerals, part by part.

Fossils are important, because they help in :

(1) Age determination of sedimentary rocks.

Index fossils : They are fossils of organisms that had lived for a short period of time in the past and had a wide geographical range, then became extinct.

⇒ **Index fossils :** indicate the age of sedimentary rocks existed in them.

(2) Figuring out the paleoenvironment.

Examples :

- **Nummulites fossils** are found in the limestone rocks of El-Mokattam mountain and they indicate that this area was a sea floor more than 35 million years ago.
- **Ferns fossils** indicate that the environment, where they lived was a hot and rainy tropical environment.
- **Coral fossils** indicate that the environment, where they lived was clear warm shallow seas.

(3) Studying life evolution.

Fossil record : The sequence of fossils in sedimentary rocks layers according to their sequence of appearance from simple to complicated.

⇒ **Archaeopteryx fossil** is considered a link between reptiles and birds.

(4) Petroleum exploration.

Microfossils like **foraminifera** and **radiolaria** indicate :

- The age of rocks existed in exploratory wells.
- The suitable conditions of petroleum formation.

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Questions ? on lesson one

Interactive Exercises

● Remember ● Understand ● Apply ♣ Higher skills 📖 School book questions.

1. Choose the correct answer :

1. 📖 Fossils are often found in ..... rocks.
   a. metamorphic b. sedimentary c. igneous d. volcanic
2. Which of the following terms is more precise in describing the remains and traces of old living organisms that were preserved in sedimentary rocks ? .....
   a. Extinction. b. The red list. c. Fossils. d. Petrification.
3. Worms' tunnels fossil is formed, because of .....
   a. the presence of hard skeleton.
   b. the activity of worms during their life.
   c. the death of the worms and quickly buried in sedimentary rocks.
   d. the death of the worms and quickly buried in ice layers.
4. The complete body fossil of mammoth is found preserved in .....
   a. amber. b. snow. c. sedimentary rocks. d. ocean.
5. 📖 Complete body fossils of insects are found preserved in .....
   a. ammonites. b. amber. c. igneous rocks. d. ambergris.
6. On the solidification of the resinous matter secreted by pine trees in the old geological periods, it forms .....
   a. ammonites fossil. b. amber fossil.
   c. trilobite fossil. d. nummulites fossil.
7. Ammonites fossil represents a mold of a/an .....
   a. snail. b. elephant. c. insect. d. scorpion.
8. If you are a collector of shells of snails and clams on the beach of the sea. Which of the following can you make a model for a fossil known as a mold ? .....
   a. A shell of ammonites snail only.
   b. A shell of clam only.
   c. A shell of ammonites snail and clam together.
   d. These shells are not suitable for making a fossil.
9. What's the kind of fossil that is formed when a plant leaf falls on a soft sedimentary rock at the beginning of formation then hardening ? .....
   a. A trace. b. A mold. c. A cast. d. A petrified fossil.

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10. When mud fills up the shell cavities and solidify, then shell decomposes, ... is produced.
    a. a solid mold b. a cast c. a petrified wood d. an amber fossil.
11. Is the cake considered as a solid mold, why ? .....
    a. Yes, because it carries the same external details of the mold.
    b. Yes, because it carries the same internal details of the mold.
    c. No, because it carries the same internal and external details of the mold.
    d. No, because it doesn't carry any details of the mold.
12. To obtain a fossil of any organism, all the following can expect to be available for it except that it .....
    a. has a hard skeleton. b. has a medium protects it from decomposition.
    c. rapidly burying after death. d. has a soft body.
13. Fossils are important for all the following except .....
    a. determination of sedimentary rocks age.
    b. studying the kinds of metals.
    c. petroleum exploration.
    d. figuring out the paleoenvironment.
14. Are the dinosaur's eggs considered as examples of petrified fossils ? .....
    a. Yes, because minerals replace whose organic matter part by part.
    b. Yes, because they carry the internal details of the eggs.
    c. No, because they aren't considered as fossils.
    d. No, because they show the remains of dinosaur after its death.
15. What happened when minerals replaced the wood of the tree's stems and trunks, which are older than 35 million years ? .....
    a. A complete body fossil has been formed.
    b. A petrified fossil has been formed.
    c. A trilobite fossil has been formed.
    d. A dinosaur tooth fossil has been formed.
16. ..... fossils are the fossils of organisms that had lived for a short period of time in the past and had a wide geographical range, then became extinct.
    a. Petrified b. Index c. Ferns d. Coral
17. Not all the fossils are considered as index fossils and that is because they are characterized by .....
    a. long range of time and limited geographical range.
    b. short range of time and wide geographical range.
    c. long range of time and wide geographical range.
    d. short range of time and limited geographical range.

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18. ..... fossils are found in the limestone rocks of El-Mokattam mountain.
a. Ferns b. Coral c. Nummulites d. Index

19. ..... fossils indicate that the environment where they lived was a hot and rainy tropical environment.
a. Ferns b. Coral c. Nummulites d. Archaeopteryx

20. Life started first in .....
a. mountain tops. b. rivers. c. Earth. d. seas.

21. ..... is one of invertebrates that appeared in seas.
a. Mammoth b. Archaeopteryx
c. Fish d. Trilobite

22. The first vertebrate appeared on the Earth is/are .....
a. man. b. birds. c. fish. d. reptiles.

23. Archaeopteryx represents a link between .....
a. vertebrates and invertebrates. b. reptiles and birds.
c. fish and amphibians. d. amphibians and reptiles.

24. The fossil record points to the life evolution in plants from simple to complicated higher forms, and the evidence for that is .....
a. angiosperms preceded gymnosperms.
b. ferns preceded mosses.
c. algae preceded mosses and ferns.
d. mosses preceded ferns.

25. Which of the following is considered as the evolution of vertebrates ? .....
a. Fish → amphibians → mammals → reptiles.
b. Ferns → amphibians → reptiles → birds.
c. Fish → amphibians → birds → mammals.
d. Fish → amphibians → reptiles → mammals.

26. ..... is an example of microfossils.
a. Mammoth b. Fern c. Foraminifera d. Archaeopteryx

27. Which of the following fossils play an important role in petroleum exploration ? .....
a. Foraminifera and radiolaria. b. Nummulites and ammonites.
c. Foraminifera and trilobite. d. Radiolaria and nummulites.

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2. Choose from column (B) what suits it in column (A) :

(1)

(A)	(B)
1. Mammoth 2. Ammonites 3. Petrified wood	a. is a cast fossil. b. is a mold fossil. c. became extinct 25 thousands years ago. d. is 150 million years in age. e. is found in Qattamiya.

(2)

(A)	(B)
1. Corals 2. Ferns 3. Nummulites 4. Archaeopteryx	a. is a link between reptiles and birds. b. is 400 million years of age. c. indicate the evolution from simple to complicated life. d. are fossils that indicate that the environment where they lived was a hot and rainy tropical. e. are fossils that indicate that the environment, where they lived was clear warm shallow seas. f. are fossils, whose age is more than 35 million years.

3. Correct the underlined words :

1. The trace is what the living organism leave after its death in the sedimentary rocks.
2. The archaeopteryx fossil is a kind of extinct elephants.
3. The first discovered fossil of mammoth was found preserved in amber.
4. The amber is a solidified colloidal matter that protects the insects inside it from decomposition.
5. Snail shell decomposes after the sediments fill its cavities, leaving a rocky cast carrying the internal details of the snail.
6. The mold is a copy of the outer shape of the shell.
7. Petrified wood is considered as rocks.
8. Dinosaur's eggs and dinosaur's tooth are examples of cast fossils.
9. Nummulites fossils indicate the age of sedimentary rocks.
10. The ammonites fossil indicates that the environment, where it lived was warm, clear and shallow seas.
11. Ammonites fossils are found in the limestone rocks of El-Mokattam mountain.
12. Ferns fossils indicate that the environment where they lived was a sea floor.
13. The fossil record points to reptiles as the first appeared vertebrates.
14. Mammoth represents a link between reptiles and birds.
15. Foraminifera and archaeopteryx are microfossils that are useful in petroleum exploration.

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4. Write the scientific term of each of the following statements :

1. Remains or traces of organisms that lived in the past and were preserved in sedimentary rocks.
2. Traces that indicate the activity of once an old living organism during its life.
3. Traces that indicate the remains of once an old living organism after death.
4. A fossil that keeps the whole shape and all the details of the body of the living organisms as a result of its rapid burying as soon as it died in a medium that preserves it from decomposition.
5. The solidified resinous matter, which was secreted by pine trees during old geologic ages.
6. A copy of the original internal details of a skeleton of an old living organism.
7. A replica of the external details of a skeleton of an old living organism.
8. The fossils which are formed as a result of replacing the wood material of trees with minerals, part by part, giving us details about the life of an old plant.
9. Replacing part by part, the wood material of trees by minerals to form petrified woods.
10. Remains of old organisms that lived in the past for a certain period, then became extinct.
11. The sequence of fossils in sedimentary rocks layers according to their sequence of appearance from simple to complicated.

5. Complete the following statements :

1. Fossils are traces and remains of ..... organisms that are preserved in ..... rocks.
2. ..... indicate the activity of an old living organism during its life, while ..... indicate the remains of once an old living organism after death.
3. ..... and ..... are examples of traces of an old living organism.
4. ..... and ..... are examples of remains of an old living organism after death.
5. The fossils types differ according to their way of .....
6. Fossils are classified according to the ways of formation into fossil of a complete body, ... , ... and .....
7. The suitable medium to form a mammoth fossil is .....
8. The complete body fossil of ..... animal was discovered in the ..... of Siberia and indicated that the animal lived 25000 years ago.
9. ..... trees secrete resinous matter, which changes into ..... after its solidification, and it protects the insect buried in it from .....
10. ..... and ..... are examples of solid mold fossils.
11. ..... and ..... are examples of cast fossils.

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12. The replica of the internal details of a skeleton of once an old living organism is called ..... ,while that of the external details is called .....
13. When the snail's shell decomposes, it will leave ..... which carries the internal details of the snail.
14. ..... replaces wood material part by part in the ..... wood fossils.
15. In petrified fossils, minerals replace the ..... matter of organism part by part leaving the ..... without any change.
16. ..... and ..... are from examples of petrified fossils.
17. The area of petrified forests in Qattamiya is known as ....., because it contains ..... which look like rocks.
18. Fossils are important for studying ..... and figuring out the .....
19. ..... fossils indicate the age of ..... rocks.
20. There is ..... fossils in the ..... rocks, which form El-Mokattam mountain.
21. Ferns fossils indicate that the environment, where they lived was ..... and rainy ..... environment.
22. Coral fossils indicate that the environment, where they lived was ..... warm and ..... seas.
23. By studying the fossil record, it shows that the life started first in ..... then established on .....
24. ..... had appeared before ferns, while gymnosperms appeared before ..... plants.
25. ..... were the first vertebrates that appeared and followed by .....
26. According to fossil record, ... and mammals appeared together after the appearance of .....
27. 📖 Archaeopteryx is the link between ..... and .....
28. 📖 Fossils are used in ..... exploration and determining the age of .....

6. Give reasons for :

1. Mammoth fossil is preserved as a complete body fossil.
2. Amber is considered as a suitable medium for the formation of complete body fossils.
3. Ammonites fossil is classified as a mold fossil.
4. Formation of petrified wood fossils.
5. 📖 Naming the petrified forest with wood mountain.
6. 📖 Petrified woods are considered from fossils although they look like rocks.
7. 📖 El-Mokattam mountain was a part of a sea floor more than 35 million years ago.
8. Nummulites fossils are considered as index fossils.
9. Not all known fossils are considered as index fossils.
10. 📖 Fossils are important in petroleum exploration.

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7. What is meant by ... ?

1. Fossils.
2. trace.
3. Remains.
4. A complete body fossil.
5. An amber.
6. A mold.
7. A cast.
8. Petrified fossils.
9. Petrified woods.
10. Petrification.
11. Index fossils.
12. A fossil record.

8. Mention an example of each of the following :

1. A trace fossil.
2. Fossil remains.
3. A fossil of complete body.
4. A fossil of cast.
5. A fossil of solid mold.
6. A petrified fossil.
7. Fossils are found in the limestone rocks of El-Mokattam mountain.
8. An organism represents a link between reptiles and birds.
9. Microfossils.

9. Mention the importance of each of the following :

1. Fossils.
2. Index fossils.
3. Nummulites fossils.
4. Coral fossils.
5. Ferns fossils.
6. Fossil record.
7. Foraminifera and radiolaria (or microfossils).

10. What is the difference between ... ?

1. Trace and remains.
2. The mammoth and amber fossils.
3. A cast and a mold.
4. A cast and a trace.
5. A mold and a trace.
6. Coral fossils and ferns fossils.
7. The importance of nummulites fossil and foraminifera fossil.

11. Choose the odd word out, then write the suitable name for others :

1. Cast / Fossil of a complete body / Fossil record / Mold.
2. Trilobile fossil / Nummulites fossil / Fossil of ferns / Ammonites fossil.
3. Fossil of dinosaur's tooth / Fossil of dinosaur's eggs / Nummulites fossil / Fossil of petrified wood.
4. Figuring out the paleoenvironment / Petrified fossils / Studying life evolution / Petroleum exploration.

12. What are the consequences of each of the following ?

1. An organism is buried fast after death in snow.
2. Dipping the old insects in amber.

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3. The solidification of the mineral sediments inside a snail, then the decomposition of its shell over millions of years.
4. Putting a clam's shell on the surface of a flat piece of clay and pressing it gently.
5. Minerals replace wood material part by part of an old tree.

13. Mention the geological criteria that prove each of the following :

1. The area of El-Mokattam mountain was a sea floor more than 35 million years ago.
2. Evolution of living organisms towards complexity and higher ranking.
3. Environment was a clear warm and shallow seas.
4. Environment was a hot and rainy tropical.
5. Probability that there is petroleum in an area when examining samples from the underground rocks.

14. Variant questions :

(1) "Paleontology is the science of studying fossils that tells us about the nature of the deep past before the creation of man".

a. What is the concept of fossils ?

b. Mention the types of fossils.

(2) "Amber preserves organisms in a complete shape without decomposition".

a. How is amber produced ?

b. What is the type of organisms that is preserved in amber ?

c. Why do not living organisms bodies decompose when preserved in amber ?

(3) Explain how the solid mold fossil is formed.

(4) "You and your classmates visited the petrified forests protectorate in Qattamiya and you have seen the petrified woods".

a. What is the age of the trees that form these petrified woods ?

b. Are these petrified woods fossils or rocks ? Why ?

c. How were petrified woods formed ?

(5) Mention the suitable conditions for fossils preservation.

(6) "Structure of organisms evolves from simple to complicated as the time passes".

a. What is the last type of animals that appeared on the Earth ?

b. What is the type of vertebrate animals that appeared before reptiles ?

c. What is the name of the fossil that represents the link between reptiles and birds ?

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(7) **"A researcher discovered microfossils like foraminifera and radiolaria when he investigated samples taken from the rocks of an exploratory well".**
What information can be concluded from this discovery ?

(8) **"Fossils indicate the paleoenvironments (past environments) where they lived throughout the old geologic ages, and hence the paleoclimate of these ages"**
Describe the environment where the following fossillized organisms lived :
a. Ferns. b. Coral. c. Nummulites.

(9) **Arrange the following fossils according to first appearance on the life stage :**
Mammoth – Cast fossil of fish – Trilobite – Crocodiles.

(10) 🕮 **Which of the following represents a cast or a mold ?**
a. Gold alloy. b. Cubes of ice.
c. Wax museum statues in Helwan. d. Models of clothes shows.
e. Face of a coin on clay.

15. Look at the following pictures, then answer the questions :

(1) 🕮 **Mention the name and the type of each fossil illustrated in the following figures :**


Fig. (a)


Fig. (b)

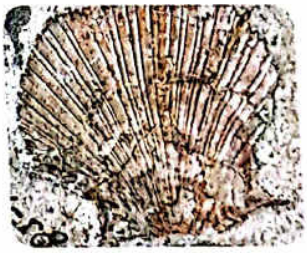

Fig. (c)


Fig. (d)


Fig. (e)


Fig. (f)

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(2) From the following fossils :



Fig. (a)



Fig. (b)



Fig. (c)

1. Mention the type of fossils (a) and (c).
2. What is the thing which is in common between the fossils (b) and (c) ?
3. **Complete :**

   If the fossil (a) is found in an area, it indicates that this area was .....

(3) From the following fossils :



Fig. (a)



Fig. (b)



Fig. (c)

1. Mention the name of each of them.
2. What is indicated by the presence of fossils (a), (b) and (c) in an area ?
3. What is the area, in which fossil (c) is found ?

16. Creative thinking :

"Your shoe was casted on a wooden mold resembling the shape of the foot".

Mention as many types of molds as you can that are being used in different purposes around you.

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Thinking Skills Questions

1. Choose the correct answer :

1. Which of the following animals can form solid mold fossil ? .....



(A)



(B)

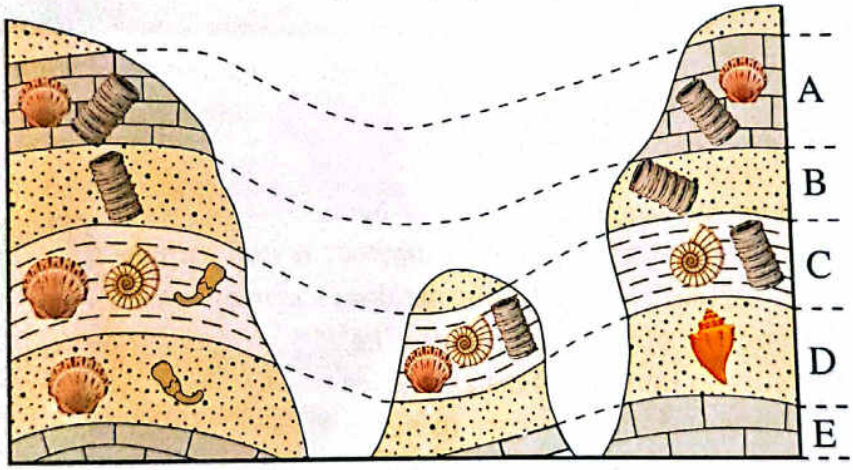


(C)



(D)

2. In the following figure, there are three rocky regions, each one of them lays far from the other, which one from the following fossils represent an index fossil ? .....





(A)



(B)



(C)



(D)

2. Can we consider dinosaur is a type of mammals ? (Give reasons)

3. Give a reason for : A trilobite fossil and a mammal animal fossil are not found together in one layer of rocks.

4. Arrange the following living organisms in ascending order according to the appearance on Earth : Frog, horse, shark, earth worm, snake.

5. We can't found old fossils between marble (a type of metamorphic rocks), Explain the reasons.

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LESSON 2

Extinction



Why are some animals species no longer exist on the planet Earth ?

From your previous studies, you know that living organisms are always in case of equilibrium. The number of a certain kind of organisms does not exceed the number of another species. The continuous decrease in number of other species without compensation of this decrease in number causes the death of all individuals of this species which is known as ***extinction***.



Extinction:

- It is the continuous decrease without compensation in the number of a certain species of living organisms until all members of species die out.
- It is dying out of all members of species of living organisms.

Using fossil record to indicate extinction

- Fossil record includes the sequence of living organisms fossils which are left in the sedimentary rocks from millions years ago.

- **Fossil record indicates :**

1. The types of living organisms which lived on Earth in different ages.

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2. The types of extinct living organisms which lived on Earth in old ages like :

- Dinosaurs



Dinosaur fossil

- Archaeopteryx



Archaeopteryx fossil

- Many types of fish



Fish fossil

Reasons of extinction

A Reasons of extinction in old ages [macro extinctions]

Many scientists attributed macro extinctions of some living organisms (like extinction of dinosaurs) due to occurrence of :

1. Meteorite impacts with Earth.
2. The violent Earth movements.
3. Exposure of the Earth to long ice age.
4. Toxic (poisonous) gases which evolved from volcanoes.



Meteorite impacts with Earth causes extinction of dinosaurs

B Reasons of extinction in recent ages

- Recent extinction occurred now is caused by different factors. Most of them are due to the interference of man with nature such as :

1 Destroying natural habitat



Cutting trees of forests

2 Overhunting



Overhunting

3 Environmental pollution



Death of marine bird due to oil pollution

4 Climatic changes resulted from industrial activities of man and natural disasters



Drought

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For illustration

From disasters that are related to climatic changes are :

- *Drought.*
- *Tornadoes.*
- *Forests fires.*
- *Torrents.*
- *Volcanoes.*
- *High marine tide (Tsunami waves).*

The extinct and endangered species

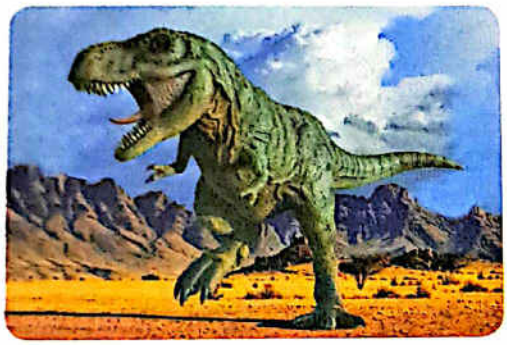
FIRST The extinct species

*** Examples of some extinct species in the old times :**

- Hundred millions of organisms extincted in the old times. The most famous of them are :

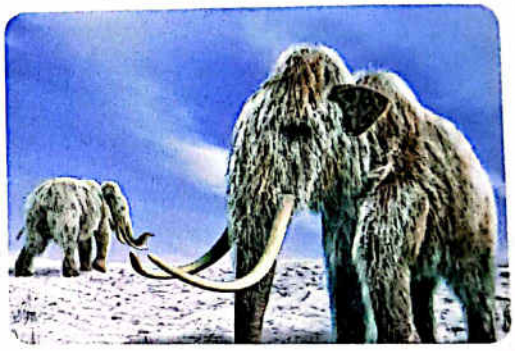
1 Dinosaur

- Dinosaur became extinct from millions of years ago.



2 Mammoth

- Mammoth is called the grandfather of recent elephant.



*** Examples of some extinct species in the recent times :**

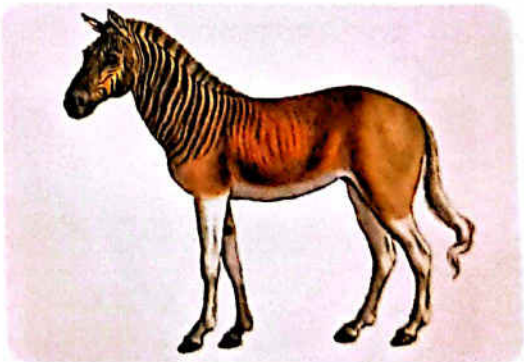
1 Dodo bird

- **It is a non-flying bird** G.R.
  Due to the reduced size of its wings so, it is an easy target for hunters.



2 Quagga

- It is a mammal animal.
- It is considered the midway between horse and zebra.



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Second The endangered species

* **Examples of some endangered species :**

- There are about 5000 endangered species like :

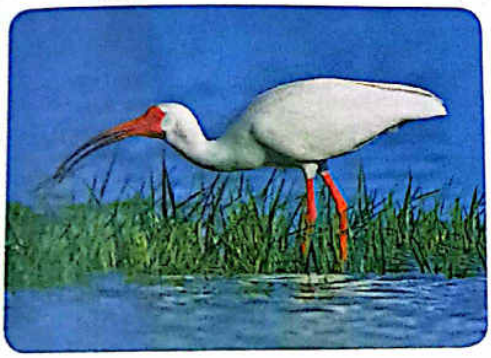
1 Panda bear



2 Rhinoceros



3 Ibis bird



4 Barbary sheep (Arui)



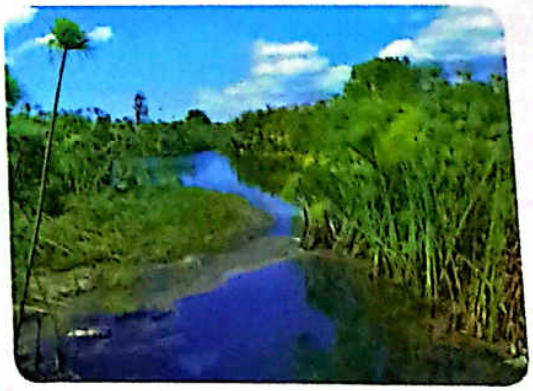
5 Bald eagle

- **It is called bald** G.R. Because its head is covered with white feathers which make it looks like bald.



6 Papyrus plant

- It is used by pharaohs to manufacture writing papers.



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Note

Ibis bird, barbary sheep and papyrus plant are considered from Egyptian environmental organisms.

TRY To Answer Worksheet 19 in the Notebook

Effect of extinction on the ecological equilibrium

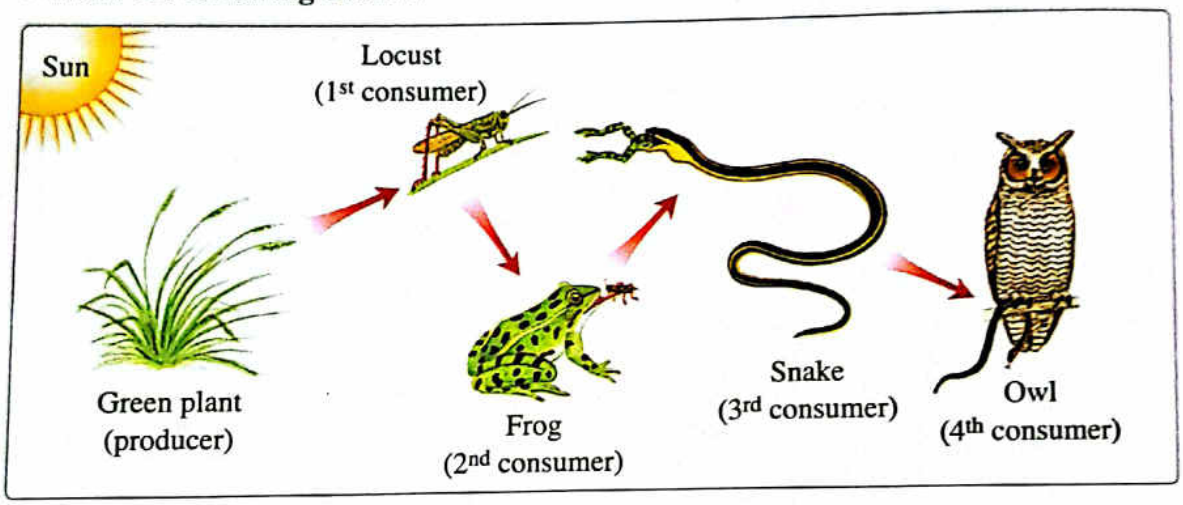
- At any ecosystem, the energy transfers through a path which is known as **food chain**.

Food chain:

It is a path of energy that transfers from a living organism to another in the ecosystem.

- Each living organism has a role in transferring energy throughout the food chain as energy transfers from producers to consumers.

❋ **As in the following chain :**



- Groups of food chains are connected forming **food web**.

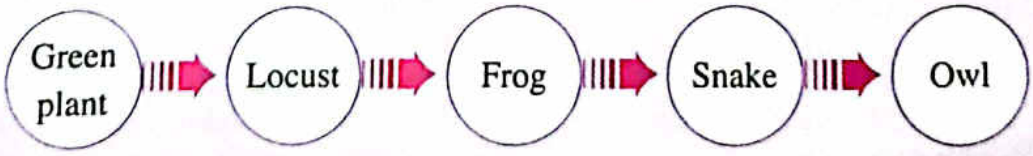
Food web:

It is a group of food chains connected with each other.

- The system remains balanced unless one of its members is absent.
- When an organism disappears, its role stops, affecting the rest of members of the food chain or the food web.

Exercise

- *The following figure shows a terrestial food chain :*



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1. What happens in the absence of frogs ?
2. What happens in the absence of snakes ?

Answer

1. Snakes die due to starvation and the number of locusts will increase and destroy the green plants.
2. Owls die due to starvation, so the number of frogs will increase and pounce on the locusts.

"In the two cases, there is a disturbance in the ecosystem"

What are the consequences of ... ?

Extinction of species or a group of species from a balanced ecosystem.

➲ It causes a cavity (cut link) in the path of energy in this ecosystem that would disturb the ecosystem equilibrium or destroy it.

• **Ecosystem is classif ied according to the degree of the effect of extinction on it into :**

1 Simple ecosystem

Simple ecosystem:

It is an ecosystem that has a few members and it is strongly affected by the absence of one of its species.

2 Complicated ecosystem

Complicated ecosystem:

It is an ecosystem that has multiple members and it is not affected much by the absence of one of its species.

Characteristics

- **It is characterized by containing a few number of members of living organisms (few members).**
- **It is strongly affected by the absence of one of its species** G.R. Because of the rarity of alternative that compensates this absence.

- **It is characterized by containing a large number of members of living organisms (multiple members).**
- **It is not affected much by the absence of one of its species** G.R. Because it has many alternatives.

Examples

• **Desert.**



• **Tropical forest.**



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Ways to protect living organisms from extinction

- It was necessary for the scientists to think in ways of protection of species endangered by extinction to keep the ecological balance and so the ecological systems from destruction.

*** Ways to protect rare and endangered living organisms :**

1. Putting laws which regulate the process of hunting of living organisms especially the rare types.
2. Increasing awareness about the importance of natural life to sustain the existence of mankind.
3. Breeding and reproducing the endangered species and sending them back to their native habitats.
4. Establishing gene banks for the endangered species.
5. Establishing natural protectorates areas.

Natural protectorates:

They are safe areas established to protect endangered species in their homeland.

*** Importance of natural protectorates :**

Natural protectorates provide the endangered species with suitable conditions for growth and reproduction away from their natural enemies.

The important world's protectorates :

Protectorate	1. Yellowstone protectorate	2. Panda protectorate
Location	USA	Northeastern China.
Protected kinds	Grey bear 	Panda bear 

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Egypt's important protectorates :

	1. Ras Mohamed protectorate :	2. Wadi El-Hetan (part of Wadi El-Raiyan protectorate).
Protectorate	It is the first established protectorate in Egypt in 1983.	
Location	South Sinai governorate.	El-Fayoum governorate.
Protected kinds	Rare species of coral reefs and coloured fish. 	Complete whales'skeleton fossils (40 million years ago). 

G.R. ***Wadi El-Hetan (part of Wadi El-Raiyan protectorate in El-Fayoum) is considered the most important area in this protectorate.***

Because it contains complete whales' fossils 40 million years ago.

Note

- Ras Mohamed protectorate (shaped as a chin).



Enrichment information

Number of natural protectorates that had been established according to the law (number 102 year 1983) is about 30 natural protectorates till 2012 which are found on about 15 % of the total area of Egypt.

TRY to answer worksheet
- General Exercise of the School Book on Unit 3
- Model Exams on Unit 3

in the Notebook

20

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Remember Lesson Two



Extinction :

It is the continuous decrease without compensation in the number of a certain species of living organisms until all members of species die out.

(or)

It is dying out of all members of species of living organisms.

Among factors causing old (or macro) extinctions are :

1. Meteorite impacts with Earth.
2. The violent Earth movements.
3. Exposure of the Earth to long ice age.
4. Toxic (poisonous) gases which evolved from volcanoes.

Among factors causing recent extinction are :

1. Destroying natural habitat.
2. Overhunting.
3. Environmental pollution.
4. Climatic changes and natural disasters.

Among examples of some extinct species in the old times are :

Dinosaur and Mammoth.

Among examples of some extinct species in the recent times are :

Dodo bird and Quagga.

Among examples of some endangered species are :

Panda bear – Rhinoceros – Bald eagle – Ibis bird - Papyrus plant and Barbary sheep.

Food chain :

It is a path of energy that transfers from a living organism to another in the ecosystem.

Food web :

It is a group of food chains connected with each other.

Ecosystem is classified according to the degree of the effect of extinction on it into :

(A) Simple ecosystem. (B) Complicated ecosystem.

Natural protectorates :

They are safe areas established to protect the endangered species in their homeland.

Ex.: Yellowstone protectorate, Panda protectorate, Ras Mohamed protectorate and Wadi El-Hetan protectorate.

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Questions ? on lesson two

Interactive Exercises

• Remember • Understand • Apply ⁂ Higher skills 🕮 School book questions.

1. Choose the correct answer :

1. ..... is the continous decrease in number of the same species of living organisms without compensation until all members of species die out.
   a. Food chain b. Extinction c. Food web d. Evolution
2. 🕮 ..... indicate(s) extinction.
   a. Fossils b. Protectorates c. Evolution d. Ecological equilibrium
3. All the following are from the hypothetical theories that explain the causes of macro extinction except .....
   a. meteorite impacts with Earth. b. poisonous gases emitted by volcanoes.
   c. occurrence of long glacial age. d. overhunting.
4. ..... is/are of the most important causes of extinction in recent ages.
   a. Volcanic eruption b. Falling of ice bergs
   c. Falling of meteorites d. Overhunting and environmental pollution
5. 🕮 All of the following are natural disasters that threaten living organisms except .....
   a. floods. b. volcanoes. c. drought waves. d. global warming.
6. ..... were famous extinct animals in old times.
   a. Dodo bird and mammoth b. Dinosaurs and quagga
   c. Dinosaurs and mammoth d. Grey bear and passenger pigeon
7. From the most common recently extinct species is/are .....
   a. dodo bird only. b. quagga only. c. bald eagle only. d. dodo bird and quagga.
8. ..... is considered the midway between horse and zebra.
   a. Quagga b. Dodo bird c. Golden frog d. Tasmanian cat
9. ..... is an extinct bird, which was characterized by the reduced size of its wings.
   a. Passenger pigeon b. Dodo bird
   c. Bald eagle d. Ibis bird
10. 🕮 All of the following are endangered species except .....
    a. panda bear. b. bald eagle. c. quagga. d. rhinoceros.
11. ..... is the path of energy that transfers from a living organism to another.
    a. Food type b. Food pyramid c. Food chain d. Food web
12. 🕮 ..... protectorate is the first established natural protectorate in Egypt.
    a. Saint Cathrine b. Ras Mohamed c. Wadi El-Hetan d. Petrified forest

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13. Yellowstone protectorate, which was established for grey bear is in .....
a. China. b. USA. c. Wadi El-Hetan. d. Ras Mohamed.

14. Ras Mohamed protectorate includes .....
a. some rare fish only. b. whales' fossils only.
c. rare coral reefs only. d. some rare fish and coral reefs.

15. The age of whales' fossils in Wadi El-Raiyan is ..... million years.
a. 20 b. 40 c. 60 d. 68

2. Choose from column (B) what suits it in column (A) :

(A)	(B)
1. Dodo bird	a. Is called the grandfather of recent elephant.
2. Mammoth	b. Is considered the midway between horse and zebra.
3. Quagga	c. Became extinct from 66 million years ago.
4. Bald eagle	d. Is a non-flying bird.
	e. Looks like bald.

3. Choose from columns (B) & (C) what suit them in column (A) :

(A)	(B)	(C)
1. Ras Mohamed	a. Panda bear	A. USA
2. Wadi El-Raiyan	b. Grey bear	B. South Sinai
3. Yellowstone	c. Rare coloured fish	C. Fayoum
4. Panda	d. Barbary sheep	D. Sidney
	e. Whales' fossils	E. Northeastern China

4. Put (✓) or (✗) , then correct the wrong ones :

1. Protectorates indicate the extinction of species of living organisms. ( )
2. Dodo bird and quagga are from extinct species in the recent times. ( )
3. Papyrus is considered as an extinct plant. ( )
4. Tropical forest is an example of complicated ecosystem. ( )
5. Establishing gene banks and natural protectorate areas are ways to protect living organisms from extinction. ( )
6. Ras Mohamed protectorate is the first established protectorate in Egypt in 1983. ( )
7. Yellowstone protectorate is found in northeastern China. ( )

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5. Correct the following statements without changing the underlined phrases :

1. Destroying the habitat is one of the factors that contribute to species adaptation.
2. Desert is a complicated ecosystem which is not affected much by the absence of one of its species.
3. Dodo bird has large size wings.
4. Ibis bird looks like bald.

6. Write the scientific term of each of the following statements :

1. The death of all members of species of living organisms.
2. A bird is characterized by small wings and it is a non-flying bird.
3. A mammal that has a shape midway between a horse and a zebra.
4. A bird which looks like bald.
5. An aquatic plant used by pharaohs to manufacture writing paper.
6. The environmental system, that is affected severely by the absence of one species of living organisms that live in it.
7. The environmental system, that is not affected severely by the absence of one species of living organisms that live in it.
8. The path that the energy takes when it is transported from a living organism to another one inside the environmental system.
9. A group of food chains connected with each other.
10. Safe places established to protect the endangered species.
11. A protectorate in the USA is established to protect the grey bear from extinction.
12. The first protectorate that has been established in Egypt and it is characterized by rare coral reefs and coloured fish.
13. The place which contains whales' skeletons and complete whales' fossils.

7. Complete the following statements :

1. Extinction is the continuous decrease in number of ..... of living organisms without ..... until all the individuals of the species .....
2. ..... indicate the extinction of species of living organisms.
3. ..... and ..... are from the causes of old extinction.

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4. ..... , ... and ..... are among the causes of recent extinction.
5. From the extinct animals in the old ages are ..... and .....
6. ..... is from recently extinct birds, while ..... is from recently extinct mammals.
7. Quagga is considered the midway between ..... and .....
8. ..... and ..... are endangered birds, while ..... and ..... are endangered mammals.
9. ..... is an example of endangered plants in Egypt, which is used by pharaohs in manufacturing of .....
10. Each living organism has a role in transferring ..... in the path of the ..... chain.
11. ..... is an example of the simple ecosystem, while ..... is an example of the complicated ecosystem.
12. ..... and ..... are among the ways that protect living organisms from extinction.
13. ..... is considered among the safe places that has endangered species.
14. ..... and ..... are considered the important world's protectorates.
15. ..... is the most important protectorate in the USA, which was established to protect .....
16. ..... is the first established protectorate in Egypt.
17. ..... is the place which contains whales' skeletons.

8. Give reasons for :

1. • Occurrence of macro extinctions for many living organisms.
   • Extinction of dinosaurs.
2. Occurrence of recent extinction.
3. Dodo bird was an easy target for hunters.
4. Naming the bald eagle by this name.
5. 🕮 The simple ecosystem is significantly affected by the absence of one of its species.
6. 🕮 Desert ecosystem is significantly affected by the absence of one of its species.
7. Tropical forest is a complicated ecosystem.
8. It is important to reproduce the endangered species and send them back to their native habitats.
9. Scientists attempt to establish a gene bank for some types of living organisms.

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10. Some governments are interested in establishing natural protectorate areas.
11. Yellowstone is an important natural protectorate.
12. World organizations are interested in studying the environment of Ras Mohamed protectorate.
13. Wadi El-Hetan is considered the most important area in Wadi El-Raiyan protectorate.

9. What is meant by ... ?

1. Extinction.
2. Food chain.
3. Food web.
4. Simple ecosystem.
5. Complicated ecosystem.
6. Natural protectorates.

10. Mention one example of :

1. Extinct bird.
2. Endangered bird.
3. Endangered plant.
4. A simple ecosystem.
5. A complicated ecosystem.
6. A natural protectorate.

11. Mention the causes of each of the following :

1. The extinction in old ages [macro extinction].
2. The recent extinction.

12. Name the organism that is indicated by each of the following statements :

1. A bird with small wings.
2. A mammal that has a shape midway between a horse and a zebra.
3. An animal, whose yellowstone protectorate has been established for it.
4. A type of organisms that is being protected in Ras Mohamed protectorate.
5. An organism, whose complete fossils are found in Wadi El-Raiyan protectorate.

13. Compare between :

1. Old extinction and recent extinction [concerning : their causes].
2. Simple ecosystem and complicated ecosystem.

14. What are the consequences of each of the following ?

1. Extinction of a species from a balanced ecosystem.
2. The absence of one type of species from the simple ecosystem.

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15. Exclude the unsuitable word and mention what the rest has in common :

1. Long glacial ages / A meteorite hits Earth / Destroying habitat / Volcanoes.
2. 🕮 Rhinoceros / Panda bear / Quagga / Bald eagle.
3. 🕮 Quagga / Dodo bird / Mammoth / Bald eagle.
4. Ras Mohamed / Yellowstone / Wadi El-Raiyan / Giza pyramids area.

16. Variant questions :

(1) "Dinosaur is one of the famous extinct animals"

What are the factors postulated by scientists that caused the extinction of this animal ?

(2) 🕮 Mention the most important factors that cause species extinction.

(3) 🕮 Mention three ways to protect living organisms from extinction.

(4) "Ras Mohamed protectorate was established in 1983"

a. Where is this protectorate located ?

b. Why is it considered one of the most important world's protectorates ?

(5) "Egypt contains some protectorates for protecting the endangered animals, one of them is Wadi El-Raiyan protectorate".

a. Where is this protectorate located ?

b. What is the name of the important area in this protectorate and what is the type of fossils which are found in this area ?

(6) 🕮 Mention what characterize each of the following :

a. Ras Mohamed protectorate.

b. Wadi El-Hetan area.

(7) 🕮 Explain the effect of extinction of a species of living organisms on :

a. simple ecosystem.

b. complicated ecosystem.

17. Study the following figures, then answer the questions :

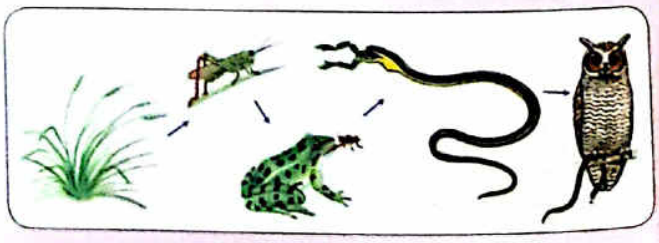
(1) "The opposite figure represents a food chain"

– What would happen if :

a. Green plant disappeared ?

b. Owl disappeared ?

c. Snake disappeared ?



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(2) "The following figures represent two different ecosystems" :

a. Which one has multiple species ?

b. Which one is able to sustain its equilibrium and continuity of its food chain when one species disappears and why ?



Fig. (1)



Fig. (2)

(3) From the opposite figure :

a. What is the organism which is indicated by this figure ?

b. Is it extinct or endangered animal ? (Give reasons).



(4) Look at the pictures of these land animals. Mention the name of each one and classify it as extinct or endangered.



(1)



(2)



(3)

(5) From the opposite figure :

a. What is the organism which is indicated by this figure ?

b. How it indicates the idea of extinction and evolution ?



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Thinking Skills Questions

1. Choose the correct answer :

1. The following sequence shows five living organisms in a food chain :

A ⟶ B ⟶ C ⟶ D ⟶ E

Which answer indicates consumer organisms ? .....

a. A , B and C b. A , D and E c. A , C and E d. B , C and D

2. A species of birds is observed on the bodies of buffaloes to catch insects that feed on the blood of buffaloes.
At the same time buffaloes feed on grass, what is the food chain that indicates the previous food relationships ? .....

a. Grass ⟶ buffaloes ⟶ birds ⟶ insects.

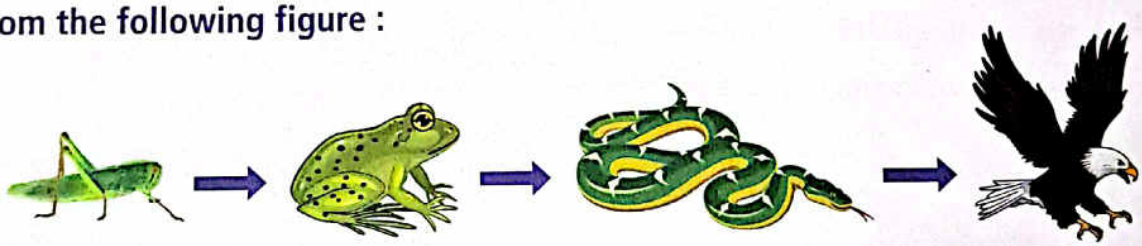
b. Grass ⟶ buffaloes ⟶ insects ⟶ birds.

c. Birds ⟶ insects ⟶ buffaloes ⟶ grass.

d. Insects ⟶ birds ⟶ buffaloes ⟶ grass.

2. Do you expect that dodo bird lived on land or on tree ? Why ?

3. From the following figure :



a. Which living organism is absent from the food chain ?

b. What is the effect of your answer on the ecosystem of this chain and for the number of frogs ?

4. In the opposite figure :



(1) If we cut the trees of the forest, what happens to ... ?

a. Living organisms inhabit the forest.

b. The quantities of O_2 and CO_2 in the surrounding air.

(2) What are the human activities that cause the destruction of forests ?

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Project .....
On UNIT THREE



A project to develop the mental organization
"Comparison"

* **Determine one similarity and one difference between each of the following pairs :**

1. Dinosaur and Elephant.

.....

2. Mammoth fossil and Amber fossil.

.....

3. Cast of ferns and Fish cast.

.....

4. Dinosaur's tooth fossil and Dinosaur's eggs fossil.

.....

5. Dinosaur and Mammoth.

.....

6. Volcanoes and Hurricanes.

.....

7. Dodo bird and Quagga.

.....

8. Panda bear and Grey bear.

.....

9. Desert and Tropical forest.

.....

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Glossary



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Unit 1

Lesson 1

Attempts	محاولات
Relationship	علاقة
Periodic table	جدول دورى
Atomic weight	الوزن الذرى
Vertical columns	أعمدة رأسية
Groups	مجموعات
Horizontal rows	صفوف أفقية
Periods	دورات
Subgroups	مجموعات فرعية
Ascending order	ترتيب تصاعدى
Periodically	دورية
Gaps	فراغات
Isotops	نظائر
X-rays	الأشعة السينية
Atomic number	العدد الذرى
Preceding	يسبق
Inert gases	غازات خاملة
Specified	خصص
Heaviest	الأثقل
Sublevels	مدارات فرعية
Artificially	صناعيًا
Blocks	فئات
Transition elements	عناصر انتقالية
Electronic configuration	التوزيع الإلكترونى

Lesson 2

Graduation	تدرج
Atomic size	الحجم الذرى
Attraction force	قوة الجذب
Electronegativity	السالبية الكهربية
Covalent	تساهمى
Polar compounds	مركبات قطبية
Metals	فلزات
Nonmetals	لافلزات
Metalloids	أشباه فلزات
Positive ion	أيون موجب
Metallic	فلزى
Nonmetallic	لافلزى
Metallic property	الخاصية الفلزية
Nonmetallic property	الخاصية اللافلزية
Dilute	مخفف
Bubbles	فقاعات
Litmus solution	محلول عباد الشمس
Basic oxides	أكاسيد قاعدية
Alkaline solutions	محاليل قلوية
Alkalis	قلويات
Chemical activity series	متسلسلة النشاط الكيميائى
Pop sound	صوت فرقعة
Instantly	لحظيًا
Coal	فحم
Burning spoon	معلقة احتراق
Acidic oxides	أكاسيد حامضية
Acids	أحماض
Amphoteric oxides	أكاسيد مترددة

Lesson 3

Alkali metals	فلزات الأقلاء
Monovalent	احادى التكافؤ
Valency	تكافؤ
Wrap	لف
Filter paper	ورقة ترشيح
Paraffin oil	زيت البرافين
Halogens	هالوچينات
Volatile	متطاير
Diatomic	ثنائية الذرة
Nuclear reactor	مفاعل نووى
Radioactive	مشع
Radiates (emits)	يشع
Gamma rays	أشعة جاما
Slides	شرائح
Liquefied nitrogen	نيتروچين مسال
Cornea of eye	قرنية العين

Lesson 4

Agricultural fields	مجالات زراعية
Industrial fields	مجالات صناعية
Personal fields	مجالات شخصية
Single covalent bond	رابطة تساهمية احادية
Hydrogen bond	رابطة هيدروچينية
Polar solvent	مذيب قطبى
Aquatic creatures	أحياء مائية
Neutral	متعادل
Electrolysis	تحليل كهربى
Negative pole	القطب السالب
Positive pole	القطب الموجب
Glowing splint	شظية مشتعلة
Acidified water	ماء محمض
Hofmann's voltameter	ڤولتامتر هوفمان

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Pollution	تلوث
Natural pollutants	ملوثات طبيعية
Artificial pollutants	ملوثات صناعية
Volcanic eruptions	انفجارات بركانية
Lightning	برق
Thunder storms	عواصف رعدية
Insecticides	مبيدات حشرية
Biological pollution	تلوث بيولوجى
Hepatitis	التهاب كبدى وبائى
Bilharzia	بلهارسيا
Chemical pollution	تلوث كيميائى
Discharging	تصريف
Sewage	مياة مجارى
Concentration	تركيز
Blindness	عمى
Infection rate	معدل الاصابة
Liver cancer	سرطان الكبد
Thermal pollution	تلوث حرارى
Radiant pollution	تلوث اشعاعى
Dumping	إلقاء
Leakage	تسرب
Developing	تطوير
Water purification stations	محطات تنقية المياه
Disinfection	تعقيم

Unit 2

Lesson 1

Atmospheric layers	طبقات الغلاف الجوى
Atmospheric pressure	الضغط الجوى
Gaseous envelope	غلاف غازى
Atmospheric air	الهواء الجوى
Atmospheric envelope	الغلاف الجوى
Normal atmospheric pressure	الضغط الجوى المعتاد
Height above sea level	الارتفاع عن سطح البحر
Elevation (altitude)	ارتفاع
Length of air column	طول عمود الهواء
Mass of atmospheric air	كتلة الهواء الجوى
Density	كثافة
Instruments	أجهزة
Day weather	طقس اليوم
Aeroplanes	الطائرات
Atmospheric pressure maps	خرائط الضغط الجوى
Curved lines	خطوط منحنية
Low atmospheric pressure areas	مناطق الضغط الجوى المنخفض
High atmospheric pressure areas	مناطق الضغط الجوى المرتفع
Atmospheric turbulences	اضطرابات فى الغلاف الجوى
Characteristics	مميزات
Thickness	سمك
Atmospheric phenomenon	ظاهرة جوية
Organize	ينظم
Vertical	رأسى
Horizontal	أفقى
Air currents	تيارات الهواء
Gradually	تدريجية
Absorption	امتصاص
Ultraviolet rays	الأشعة فوق البنفسجية
Ozone layer	طبقة الأوزون
Ozonic atmospheric envelope	الغلاف الجوى الأوزونى
Convenient	ملائم / مناسب
Meteors	شهب
Luminous	مضئ
Vacuumed (highly rarefied)	مخلخل أو مفرغ
Friction	احتكاك
Limited quantities	كميات محدودة
Thermal layer	طبقة حرارية
Wireless communications	اتصالات لاسلكية
Broadcasting	البث الاذاعى
Radio waves	أمواج الراديو
Radio stations	محطات الاذاعة
Communication centres	مراكز الاتصالات
Charged ions	أيونات مشحونة
Magnetic belts	أحزمة مغناطيسية
Van-Allen belts	حزامى فان آلين
Cosmic radiations	الأشعة الكونية
Aurora phenomenon	ظاهرة الشفق القطبى
Brightly coloured light curtains	ستائر خفيفة لامعة اللون
Outer space	الفضاء الخارجى
Satellites	أقمار صناعية

Lesson 2

Erosion of ozone layer	تآكل طبقة الأوزون
Global warming phenomenon	ظاهرة الأحترار العالمى
Greenhouse effect	ظاهرة الاحتباس الحرارى (أثر الصوبة الزجاجية)
Postulate	يفترض
Standard temperature and normal pressure	معدل الضغط ودرجة الحرارة

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Dobson units	وحدات دوبسون
Degree of ozone layer	درجة طبقة الأوزون
Near ultraviolet rays	الأشعة الفوق بنفسجية القريبة
Medium ultraviolet rays	الأشعة الفوق بنفسجية المتوسطة
Far ultraviolet rays	الأشعة الفوق بنفسجية البعيدة
Penetrate	يخترق
Protective shield	غلاف حماية
Chemical effect	تأثير كيميائى
Ozone hole	ثقب الأوزون
Pollutants	ملوثات
Chlorofluorocarbon compounds	مركبات الكلوروفلوروكربون
Commercially	تجاريًا
Cooling substance	مادة مبردة
Air conditioning sets	أجهزة تكييف الهواء
Propellant substance	مادة دافعة
Flating substance	مادة نافخة
Foam backing	دعامة من الفوم
Solvent substance	مادة مذيبة
Electric circuits boards	لوحات دوائر كهربية
Agricultural crops	محاصيل زراعية
Fire extinguishers	طفايات الحريق
Ultrasound airplanes (concorde)	طائرات تفوق سرعتها سرعة الصوت
Intergovernmental Panel on Climate Changes	الهيئة العالمية للتغيرات المناخية
United nations	الأمم المتحدة
Concentration	تركيز
Cutting trees	قطع الأشجار
Forests fires	حرائق الغابات
Greenhouse gases	الغازات الدفيئة
Interpretation	ترجمة/تفسير
Permit	يسمح
Absorb	يمتص
Infrared radiations	الأشعة تحت الحمراء
Negative effects	أثار سلبية
Melting of polar ice	انصهار جليد القطبين
Threats	تهديدات
Coastal areas	مناطق ساحلية
Polar bear	الدب القطبى
Seal	فيل البحر
Melting of snow masses	انصهار كتل جليدية
Floods	فيضانات
Drought waves	أمواج الجفاف

Unit 3

Lesson 1

Fossils	حفريات
Traces	أثار
Remains	بقايا
Old living organisms	كائنات حية قديمة
Preserve	يحفظ
Sedimentary rocks	صخور رسوبية
Worms' tunnels	أنفاق ديدان
Dinosaur's foot print	أثر قدم ديناصور
Shark's teeth	أسنان قرش
Dinosaur's skull	جمجمة ديناصور
Fossil of complete body	حفرية كائن كامل
Mold	قالب
Cast	طابع
Petrified fossils	حفريات متحجرة
Petrified woods	أخشاب متحجرة
Amber	كهرمان
Old geologic ages	عصور جيولوجية قديمة
Resinous matter	مادة صمغية
Decomposition	تحلل
Solid mold	قالب مصمت
Plaster	شريط لاصق
Replica	نسخة طبق الأصل
Soft parts	أجزاء رخوة
Sediments	رواسب
Clay	صلصال
Plane surface	سطح مستوى
Cast of ferns	طابع من السرخسيات
Fish cast	طابع سمكة
Minerals	أملاح معدنية
Dinosaur's eggs	بيض ديناصور
Environmental conditions	ظروف بيئية
Petrification	التحجر
Petrified forests	غابات متحجرة
Organic matter	مادة عضوية
Hard skeleton	هيكل صلب
Importance	أهمية
Age determination of sedimentary rocks	تحديد عمر الصخور الرسوبية
Figuring out the paleoenvironment	الاستدلال على البيئات القديمة
Studying life evolution	دراسة تطور الحياة
Petroleum exploration	التنقيب عن البترول

Index fossils	حفريات مرشدة
Wide geographic distribution	مدى جغرافى واسع
Ferns fossils	حفريات السرخسيات
Coral fossils	حفريات المرجان
Limestone rocks	صخور الأحجار الجيرية
Fossil record	سجل حفرى
Extinction	انقراض
Appear	يظهر
Algae	طحالب
Mosses	حزازيات
Gymnosperms	عاريات البذور
Angiosperms	كاسيات البذور
Invertebrates	اللافقاريات
Mullusks with shells	رخويات ذات أصداف
Vertebrates	فقاريات
Amphibians	برمائيات
Reptiles	زواحف
Birds	طيور
Mammals	ثدييات
Exploratory wells	آبار استكشافية
Microfossils	حفريات دقيقة

Lesson 2

Extinction	انقراض
Continuous decrease	تناقص مستمر
Dying out	فناء
Compensation	تعويض
Species	أنواع
Macro extinctions	انقراضات كبرى
Recent extinction	انقراض حديث
Meteorites	النيازك
Long glacial ages	عصور جليدية طويلة
Poisonous gases	غازات سامة
Volcanoes	براكين
Interference of man	تدخل الإنسان
Destroying natural habitat	تدمير الموطن الطبيعى
Overhunting	الصيد الجائر
Environmental pollution	تلوث بيئى
Climatic changes	تغيرات مناخية
Natural disasters	كوارث طبيعية
Ecosystem	النظام البيئى
Extinct species	أنواع منقرضة
Endangered species	أنواع مهددة بالانقراض
Protect	يحمى
Panda bear	دب الباندا
Rhinoceros	الخرتيت
Bald eagle	النسر الأصلع
Ibis bird	طائر أبو منجل
Papyrus plant	نبات البردى
Barbary sheep	كبش أروى
Ecological equilibrium	توازن بيئى
Food chain	سلسلة غذائية
Food web	شبكة غذائية
Simple ecosystem	نظام بيئى بسيط
Complicated ecosystem	نظام بيئى مركب
Desert ecosystem	نظام بيئى صحراوى
Tropical forest ecosystem	نظام بيئة غابة استوائية
Members	أنواع
Awareness	وعى
Natural protectorates	محميات طبيعية
Safe areas	أماكن آمنة
Yellowstone protectorate	محمية يلوستون
Ras Mohamed protectorate	محمية رأس محمد
Coral reefs	شعاب مرجانية
Whales' skeletons	هياكل عظمية للحيتان

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SCIENCE

NOTEBOOK 2023

FIRST TERM

BY A GROUP OF SUPERVISORS

- Worksheets
- Final Revision
- Final Examinations



EL-MOASSER SERIES

2nd prep

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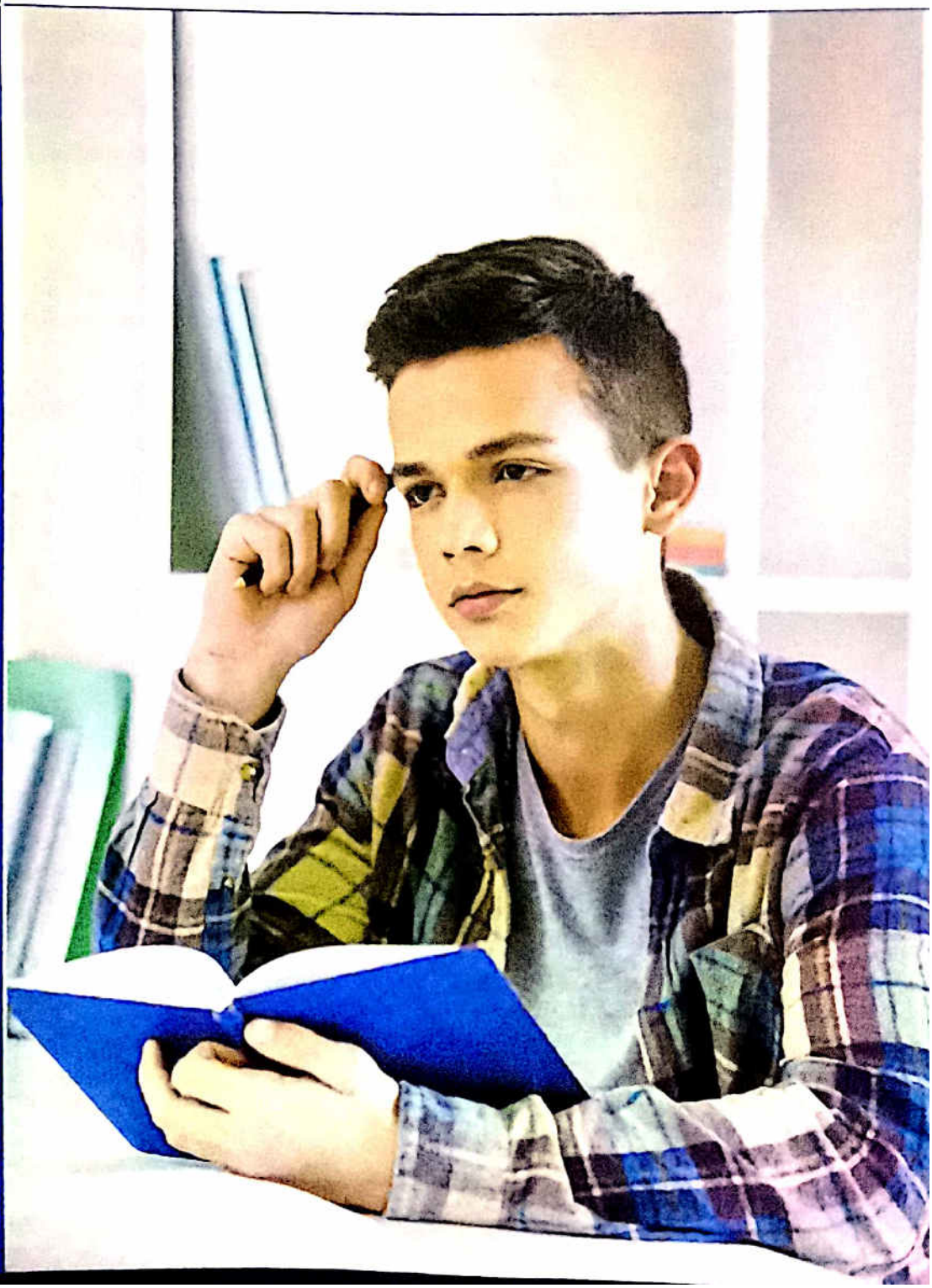
PART 1

Worksheets

Unit One : Periodicity of Elements and their Properties.

Unit Two : The Atmosphere and Protecting the Planet Earth.

Unit Three : Fossils and Protecting Species from Extinction.



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UNIT 1

Lesson One

Attempts of Elements Classification

Worksheet 1

1. A. Choose the correct answer :

1. Mendeleev arranged the elements of similar properties in .....
   a. vertical periods. b. horizontal groups.
   c. vertical groups. d. horizontal periods.
2. Moseley classified elements in his table in an ascending order according to their .....
   a. atomic weights. b. atomic numbers.
   c. chemical activity. d. valencies.
3. The number of elements in Mendeleev's periodic table is ..... elements.
   a. 67 b. 76 c. 92 d. 116
4. ..... left gaps in his table to be filled with suitable discovered elements in future.
   a. Moseley b. Rutherford c. Bohr d. Mendeleev
5. The scientist ..... added the zero group to Mendeleev's periodic table.
   a. Mendeleev b. Rutherford c. Moseley d. Bohr
6. The scientist ..... discovered the main energy levels. *(El-Dakahlia 2020)*
   a. Moseley b. Bohr c. Hofmann d. Mendeleev

B. Write the scientific term :

1. A table in which the elements are arranged in an ascending order according to their atomic weights. *(Futures Sch. / Cairo 2020)* (.....)
2. A table in which the elements are arranged in an ascending order according to their atomic numbers. *(El-Sharkia 2020)* (.....)
3. They are symbolized by K , L , M , N , O , P and Q letters. (.....)

2. A. Complete the following statements :

1. Mendeleev discovered that the properties of elements were repeated ..... by the beginning of each new .....
2. The atomic number of each element in Moseley's periodic table increases by ..... from the preceding element in the same .....
3. Moseley specified a place below the table for ..... and ..... elements. *(Leaders Lang. Sch. / Cairo 2022)*

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4. Mendeleev arranged the elements ascendingly according to ..... , while Moseley arranged them ascendingly according to ..... *(Manor House Int. Sch. / Cairo 2022)*

5. Mendeleev explained his periodic table in his book .....

B. What are the disadvantages of Mendeleev's table ? (Mention two only).

.....

.....

3. A. To who are these achievements attributed :

1. Corrected the atomic weights of some elements which were estimated wrongly. (.....)
2. Added zero group to the periodic table. (.....)
3. Discovered that the nucleus of the atom contains positively charged protons. *(St. Joseph Sch. / Cairo 2020)* (.....)

B. Put (✓) or (✗), then correct what is wrong :

1. The elements which have similar chemical properties are put in horizontal periods. *(Essmat Sch. / Cairo 2020)*

( ) .....

2. Scientists classified the elements in order to facilitate their study.

( ) .....

3. Mendeleev had to put more than one element in one cell, as iron, cobalt and nikel.

( ) .....

4. Rutherford discovered the main energy levels of the atom.

( ) .....

4. A. Give a reason for :

Many attempts are made by scientists for classification of elements.

.....

.....

B. Correct the underlined words :

1. The elements are arranged in **Mendeleev's table** in an ascending order according to their atomic numbers and the way of filling their energy sublevels with electrons. (.....)
2. The number of energy levels in the heaviest known atoms is **9** levels. (.....)
3. The number of known elements in the modern periodic table till now is **92** elements. *(Manarat Sch. / Cairo 2020)* (.....)

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Worksheet 2

1. A. Complete the following statements :

1. The number of elements which exist in nature is .....
2. Elements of s-block are located on the ..... of the periodic table and they arranged in ..... groups.
3. The period number of the element equals the number of ..... occupied by electrons in its atom.
4. The transition elements start from period ..... in the modern periodic table.
5. The modern periodic table consists of ..... horizontal periods and ..... vertical groups.

B. What is the scientific principle upon which the elements are arranged in the modern periodic table ?

.....

.....

2. A. Write the scientific term :

1. • A block of elements which is located on the right side of the periodic table.
   • The block which contains the groups from (3A) to (0). (.....)
2. A kind of elements that are located in d-block. (.....)
3. It indicates the number of electrons that revolve in energy levels. (.....)
4. The block which contains the lanthanides and actinides.

(St. Joseph Sch. / Cairo 2020) (.....)

B. Locate the position of the following elements in the modern periodic table :

1. $_{11}Na$: ..... *(Degla Valley Sch. / Cairo 2020)*
2. $_{18}Ar$: ..... *(Degla Valley Sch. / Cairo 2020)*
3. $_{20}Ca$: ..... *(Akhnaton Sch. / Cairo 2020)*
4. $_{9}F$: .....

C. From the following table :

	Groups							
	1A	2A	3A	4A	5A	6A	7A	0
Second period					Y			
Third period	X							Z

[NB. The letters in the table don't represent the actual symbols of elements]

1. Calculate the atomic number of element (X).

.....

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2. What is the modern number of the group of the element (Y) ?

.....

3. **Complete :** The outermost energy level of element (Z) contains ..... electrons.

3. A. Choose the correct answer :

1. Elements of p-block are arranged in ..... groups. *(Manaret Sch. / Cairo 2020)*

a. two b. five c. six d. eight

2. Which of the following elements locates in the third period ? .....

a. $_{19}K$ b. $_{15}P$ c. $_{6}C$ d. $_{3}Li$

3. All of the following elements are located in group (2A) except .....

a. $_{4}Be$ b. $_{20}Ca$ c. $_{11}Na$ d. $_{12}Mg$

4. The element that its atomic number equals 17 is similar in its chemical properties to the element that its atomic number equals .....

a. 2 b. 7 c. 9 d. 19

5. The elements which have the same properties locate in the same ..... in the periodic table.

a. period b. group c. nucleus d. energy level

6. The block that contains groups (1A) and (2A) in the periodic table is ..... block.

a. s b. p c. d d. f

7. Which of the following elements locates in the same group in the periodic table ? .....

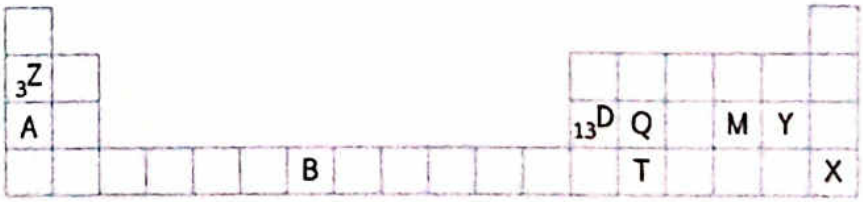
a. $_{11}Na, _{6}C$ b. $_{11}Na, _{3}Li$ c. $_{11}Na, _{29}Cu$ d. $_{11}Na, _{10}Ne$

8. An element, its atomic number is (18) , so it is considered as .....

a. a transition element. b. an inert gas.

c. a metallic element. d. a halogen.

B. The following table represents a section of the modern periodic table :



[NB. The letters in the table don't represent the actual symbols of elements]

1. What is the symbol indicates each of the following :

a. A transition element : .....

b. An inert gas : .....

c. An element lies in the third period and group (6A) : .....

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2. What is the block of the elements (A), (B) and (D) ?

.....

3. **Choose :** The atomic number of element (B) is ..... the atomic number of element (T).

a. more than b. equal to c. less than

4. A. Find the atomic number of each of the following :

1. An element exists in period 2 and group (6A).

.....

2. An element exists in period 3 and group (1A).

.....

3. An element exists in period 2 and group (0).

.....

B. Put (✓) or (✗), then correct what is wrong :

1. The modern periodic table consists of three blocks of elements.

( ) .....

2. The period number of the element equals the number of electrons in the outermost energy level in its atom.

( ) .....

3. The atomic number of every element increases by one electron over the element that precedes it in the same period.

( ) .....

C. Give a reason for :

Elements of the same group have similar properties. *(El-Menofia 2020)*

.....

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UNIT 1

Lesson Two

Graduation of Elements Properties in the Modern Periodic Table

Worksheet 3

1. Complete the following statements :

1. The ability of the atom in covalent molecule to attract the electrons of the chemical bond towards itself, is known as .....
2. A covalent polar compound that is formed of one oxygen atom and two hydrogen atoms, is known as .....
3. The smallest atomic size element is located at the ..... of the periodic table, while the largest atomic size element is located at the ..... of the periodic table.
4. A covalent polar compound that has lower polarity than water and has three single covalent bonds, is known as .....

2. A. Give reasons for :

1. The atomic size of sodium ($_{11}Na$) is greater than that of magnesium ($_{12}Mg$).

.....

.....

2. In the same group as we go from up to down, the atomic size increases by increasing the atomic number.

(Science Inspectorate / Ismailia 2022)

.....

3. Ammonia (NH_3) is considered as a polar covalent compound.

.....

4. Water is much more polar than ammonia.

.....

.....

B. What happens when ... ?

Increasing the atomic number for elements of the third period [related to : the atomic size].

.....

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3. **A. Compare between :**

The group and the period. (concerning the graduation of atomic size property) :

The group	The period
.....	.....
.....	.....
.....	.....
.....	.....

B. Show the graduation of the atomic size property of elements of the same period by increasing the atomic number. Draw the relationship that shows this graduation.

.....

.....

4. **A. Write the scientific term :**

1. The measuring unit of atomic size. *(Science Inspectorate / Behira 2022)* (.....)
2. They are covalent compounds in which the difference in electronegativity between their elements is relatively high. (.....)

B. Put (✓) or (✗), then correct what is wrong :

1. In the same period as we go from left to right, the atomic size decreases by increasing the atomic number.

( ) .....

2. Picometre = Part of million of the million part of a centimetre.

( ) .....

Worksheet 4

1. **A. Write the scientific term :**

1. Elements which have less than 4 electrons in their outermost energy level. (.....)
2. An atom of nonmetallic element that gains one electron or more during the chemical reaction. *(Dream Sch. / Giza 2020)* (.....)
3. The strongest nonmetal in group (7A). *(Leaders Sch. / Alexandria 2020)* (.....)

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B. Correct the underlined words :

1. The number of electrons in positive ion is **greater** than that of its atom. *(Port Said 2020)* (.....)
2. Each period ends by **a nonmetal element**. *(Manaret Sch. / Cairo 2020)* (.....)
3. The metallic property **decreases** in group (1A) as we go from the top to the bottom. (.....)
4. **Lithium** is the strongest metallic element in group (1A). (.....)

2. Complete the following statements :

1. During chemical reactions, atoms of metals tend to ..... electron(s) and change into ..... which carry a number of positive charges equals to the number of lost ..... *(Leaders Lang. Sch. / Cairo 2022)*
2. Silicon ($_{14}Si$) is a ..... element which has the properties of ..... and .....
3. By increasing the atomic number within the same period, the metallic property ..... , while the nonmetallic property .....
4. The most metallic element in group (1A) is located at the ..... of this group, while the least metallic element is located at the ..... of the same group.
5. Each period in the modern periodic table starts with ..... element. *(St. Joseph Sch. / Cairo 2020)*

3. A. Choose the correct answer :

1. All of the following ions have the same electronic configuration of neon ($_{10}Ne$) except .....
   a. Al^{+3} b. Na^{+} c. Li^{+} d. Mg^{+2}
2. An element (X), its atomic number is 15, so the number of electrons in its ion equals .....
   a. 10 b. 15 c. 17 d. 18
3. By increasing the atomic number within the same period, the ..... *(Bloom Sch. / Giza 2020)*
   a. metallic property increases. b. metallic property decreases.
   c. nonmetallic property decreases. d. atomic size increases.
4. An element (Y), its atomic number is 13, so the electronic configuration of its ion is ..... *(Sherif Talat Sch. / El-Sharkia 2020)*
   a. 2 , 8 b. 2 , 8 , 3 c. 2 , 8 , 8 d. 2 , 8 , 8 , 3
5. All of the following elements are from semi-metals except .....
   a. tellurium. b. silicon. c. boron. d. bromine.

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B. Give a reason for :

Cesium is considered one of the strongest metallic elements. *(St. Joseph Sch. / Cairo 2020)*

.....

4. A. What is meant by ... ?

1. Nonmetals : .....

.....

2. Positive ion : .....

.....

3. Metalloids : ..... *(Dream Sch. / Giza 2020)*

.....

B. Look at the following figures, then answer the following questions :

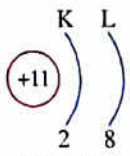


Fig. (A)

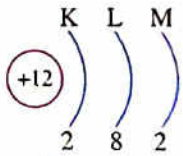


Fig. (B)

1. Which of the previous figures represents :

a. A positive ion : .....

b. A neutral atom : .....

2. Determine the location of the neutral atom in the periodic table :

.....

Worksheet 5

1. A. Show by symbolic balanced equations each of the following :

1. Adding dilute HCl to pieces of magnesium. *(East Alex. Directorate / Alex. 202)*

.....

2. Burning a magnesium strip in air, then adding some water.

(El-Manahel Private Lang. Sch. / Sohag 202)

.....

.....

3. Burning a piece of coal in air.

(Borg El-Arab Zone. / Cairo 202)

.....

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B. How can you differentiate between copper and potassium :

	Copper	Potassium
By adding each of them to water :	.....	.....

2. A. What is meant by ...?

(Damietta 2020)

1. Chemical activity series :

.....

.....

2. Acidic oxides :

.....

.....

B. Choose the correct answer :

1. All of the following elements don't react with dilute HCl, except .....

a. Cl b. Zn c. S d. C

2. All of the following are related to CO_2 gas, except ..... *(Bloom Sch. / Giza 2020)*

a. it is acidic oxide. b. it is nonmetal oxide.

c. its solution turns litmus to red. d. its solution turns litmus to blue.

3. Metal oxides are ..... oxides.

a. acidic b. basic c. neutral d. amphoteric

4. Sodium oxide is from ..... oxides. *(Leaders Sch. / Alexandria 2020)*

a. amphoteric b. acidic c. nonmetallic d. basic

3. A. Complete the following statements :

1. Some metal oxides dissolve in water forming ..... , which turn litmus solution into ..... *(Borg El-Arab Zone. / Alexandria 2020)*
2. Sodium reacts with water and ..... gas evolves which ..... with a ..... sound.
3. Both of ..... and ..... are metals, which react at high temperatures only with hot water vapour.
4. When magnesium oxide dissolves in water, it gives ..... , while carbon dioxide dissolves in water giving .....
5. Basic oxides are formed by the reaction of ..... with oxygen, while acidic oxides are formed by the reaction of ..... with oxygen.

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6. $CO_2 + H_2O \longrightarrow$ .....

7. Zn + ... $\xrightarrow{dil.}$ $ZnSO_4$ + ...

B. Compare between basic oxides and acidic oxides (two points only) : *(Akhnaton Sch. / Cairo 202)*

Basic oxides	Acidic oxides
.....	.....
.....	.....
.....	.....

4. A. $C + O_2 \xrightarrow{\Delta}$ (a)

(a) + $H_2O \longrightarrow$ (b)

1. Write the name and the chemical formula of each (a) and (b).

.....

2. What is the effect of (b) on litmus solution ?

.....

B. What happens when ... ?

1. Putting a burning magnesium strip inside a jar filled with oxygen gas.

.....

2. Adding drops of violet litmus solution to a cylinder containing a piece of burning coal. *(El Qalyoubia 202)*

.....

3. Dissolving magnesium oxide in water. *(Dream Sch. / Giza 202)*

.....

Worksheet 6 on Lessons one & two Unit 1

1. A. Choose the correct answer :

1. Mendeleev arranged elements of similar properties in vertical columns called later as .....

a. groups. b. periods. c. rows. d. lines.

2. ..... explained his periodic table in his book "Principles of Chemistry".

a. Moseley b. Rutherford c. Bohr d. Mendeleev

3. Helium locates in ..... group.

a. 2A b. 3A c. 4A d. zero

4. Nucleus is positively charged because it contains .....

a. electrons. b. protons. c. neutrons. d. energy levels.

5. ..... react very slowly with cold water. *(Damietta 2020)*

a. Ca & Mg b. K & Na c. Zn & Fe d. Cu & Ag

B. Give reasons for :

1. Mendeleev left gaps in his periodic table. *(Akhnaton Sch. / Cairo 2020)*

.....

.....

2. Sulphur dioxide is considered as an acidic oxide.

.....

2. A. Complete the following :

1. The scientist who discovered that the nucleus contains positively charged protons, was .....
2. In the modern periodic table, the largest atom in size is ..... atom, and the smallest one is ..... atom.
3. Both of ..... and ..... don't react with water.

B. Locate the position of the following elements in the modern periodic table :

1. $_{10}Ne$: ..... *(Essmat Sch. / Alexandria 2020)*
2. $_{5}B$: .....
3. $_{14}Si$: .....
4. $_{6}C$: .....

3. A. Put (✓) or (✗), then correct what is wrong :

1. The p-block elements are located in the left side of the periodic table.

( ) .....

2. The f-block contains lanthanides and actinides.

( ) .....

3. Na_2O is an acidic oxide.

( ) .....

B. What happens when ... ?

1. Burning of carbon in oxygen.

.....

2. Sodium atom loses one electron during the chemical reaction.

.....

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4. A. Find the atomic number of each of the following :

1. An element exists in period (4) and group (1A).

.....

2. An element exists in period (2) and group (7A).

.....

3. An element exists in period (3) and group (5A).

.....

B. Give an example for :

1. A polar covalent compound : ..... *(Manaret Sch. / Cairo 20)*
2. A nonmetallic element : .....
3. A metalloid : .....
4. A metal reacts instantly with water : ..... *(El-Gharbia 20)*
5. A metal doesn't react with water : ..... *(Science Inspectorate / Qalyoubia 20)*
6. A basic oxide : .....
7. An acidic oxide : ..... *(El-Dakahlia 20)*

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UNIT 1

Lesson Three

Main Groups in the Modern Periodic Table

Worksheet 7

1. A. Write the scientific term :

1. A group of metals which react strongly with water forming alkaline solutions. (.....)
2. A substance which kept under its surface most alkali metals. (.....)

B. Choose the correct answer :

1. Elements which have atomic numbers ..... are called alkali metals.
   a. 2 , 8 , 16 b. 2 , 10 , 18 c. 3 , 11 , 19 d. 4 , 12 , 20
2. Alkali metals have all the following properties, except .....
   a. they have low density. b. they conduct electricity.
   c. they conduct heat. d. they don't react with water.
3. When sodium reacts with water, ... gas evolves. *(Akhnaton Sch. / Cairo 2020)*
   a. O_2 b. CO_2 c. H_2 d. NO_2
4. Most ..... are kept under the surface of kerosene in the lab.
   a. alkali metals b. halogens c. inert gases d. alkaline Earth metals
5. The most active element in group (1A) is ..... *(Akhnaton Sch. / Cairo 2020)*
   a. Na b. Cs c. K d. Li

2. Give reasons for :

1. Elements of group (1A) are known as alkali metals. *(Essamt Sch. / Alexandria 2020)*

   .....

2. Sodium is kept under the surface of kerosene.

   .....

3. Rubidium and cesium elements sink in water.

   .....

4. The reaction of potassium with water is stronger than that of sodium.

   .....

   .....

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3. Complete the following statements :

1. Lithium element ..... on water surface, as its density is ..... than that of water.
2. During the chemical reactions, sodium tends to ..... an electron and changes into ..... ion which carries ..... positive charge.
3. Potassium reacts with water giving ..... and ..... gas evolves.
4. The chemical activity of alkali metals increases as the ..... increases.

4. The opposite figure represents group (1A) of the periodic table.

Answer the following questions :

1. The element which has the electronic configuration (2, 8, 8, 1) is .....
2. The most metallic element is .....
3. Elements which float on the water surface are .....
4. The least metallic element is .....

A
B
C
D
E

[NB. The letters don't represent the actual symbols of elements]

Worksheet 8

1. A. Complete the following :

1. Halogens locate in group .....
2. Halogens which exist in gaseous state includes ..... , ...

(Leaders Sch. Alexandria 2020)

3. We use ..... to preserve food as it emits gamma rays.
4. Silicon is used in manufacture of ....., while liquefied nitrogen is used in .....

B. Write the scientific term :

1. The halogen which exists in a liquid state. *(El-Menofia 2020)* (.....)
2. Rays which are emitted from radioactive cobalt 60. (.....)

2. A. Which of the following elements ($_{11}X$) , ($_{17}Y$) and ($_{14}Z$) :

1. Can replace iodine in potassium iodide solution : .....
2. Used in the manufacture of electronic slides : .....
3. Can react together and form salt : .....

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B. Mention one use for each of the following :

1. Liquid sodium : ..... *(Aswan 2020)*

2. The radioactive cobalt 60 : .....*(Essmat Sch. / Alexandria 2020)*

3. A. Put (✓) or (✗), then correct what is wrong :

1. Halogens are monovalent elements.

( ) .....

2. Boiling point of liquefied nitrogen is (–196°C).

( ) .....

3. Bromine is a halogen which exists in a solid state.

( ) .....

B. Give reasons for :

1. Halogens are not exist in nature in elementary state.

.....

2. Halogens are called by this name. *(Qena 2020)*

.....

3. Liquefied nitrogen is used in cornea preservation. *(Kerdasa Directorate / Giza 2022)*

.....

4. A. Complete the following equations :

1. $Br_2 + NaCl \longrightarrow$ .....

2. $Cl_2 + 2KI \longrightarrow$ ..... + ...

3. $2K + Br_2 \longrightarrow$ .....

B. Choose the odd word out, then mention the scientific term for the rest :

1. Potassium / Iodine / Fluorine / Astatine / Bromine.

2. Fluorine / Chlorine / Oxygen / Hydrogen / Sodium.

.....

.....

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Worksheet 9 on Lessons One, Two & Three Unit 1

1. A. Complete the following statements :

1. ..... is a radioactive element.
2. Halogens mean .....
3. Both of ..... and ..... are examples of acidic oxides.
4. Elements of the same ..... are similar in the number of electrons in the outermost energy level.

B. Write the scientific term of each of the following :

1. The metalliod which is used in the manufacture of electronic devices.

(Borg El-Arab Zone. / Alexandria 2020) (.....)

2. The halogen which exists in a solid state.

(Borg El-Arab Zone. / Alexandria 2020) (.....)

2. A. Correct the underlined words :

1. Liquefied nitrogen is used in **food preservation**. (.....)
2. Halogens exist in the form of **monoatomic** molecules. (.....)
3. Transition elements lie in **s-block**. *(El-Menofia 2020)* (.....)

B. Give reasons for :

1. Potassium is more active than sodium. *(Manaret Sch. / Cairo 2020)*

.....

.....

2. Iodine can't replace bromine in its salt solution.

.....

.....

3. A. Choose the odd word (or symbol) out :

1. SO_2 / MgO / Na_2O / CaO

.....

2. Fluorine / Chlorine / Iodine.

.....

3. Sodium / Magnesium / Aluminium / Sulphur.

.....

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B. What happens when ... ?

1. Increasing the atomic number in period 1 (Concerning the atomic size).

.....

2. Putting a piece of potassium in a beaker containing paraffin oil.

.....

4. A. Choose the correct answer :

1. ..... is used in food preservation.

a. Sodium b. Cobalt 60 c. Silicon d. Liquefied nitrogen

2. Carbon dioxide reacts with water forming .....

a. H_2CO_3 b. HCl c. HNO_3 d. H_2SO_4

3. Al_2O_3 is known as .....

a. acidic oxide. b. basic oxide.

c. amphoteric oxide. d. alkaline oxide.

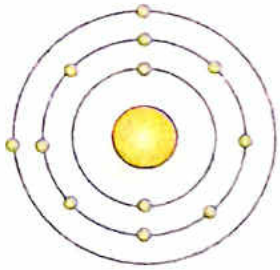
4. The electronic configuration of the ion of potassium ($_{19}K$) element is similar to the electronic configuration of the atom of ..... element.

a. $_{11}Na$ b. $_{10}Ne$ c. $_{18}Ar$ d. $_{15}P$

5. The electronic configuration of neon atom ($_{10}Ne$) is similar to that of the ions of all the following atoms, except .....

a. $_{9}F$ b. $_{8}O$ c. $_{7}N$ d. $_{16}S$

B. The opposite figure represents the electronic configuration of element (X) that presents in the modern periodic table :



1. Determine :

a. The location of the element : .....

b. The block to which this element belongs to : .....

2. Conclude the atomic number of :

a. element (Y) that follows it in the same period :

.....

.....

b. element (Z) that follows it in the same group :

.....

.....

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UNIT 1

Lesson Four

Water

Worksheet 10

1. A. Choose the correct answer :

1. All of the following are from water properties except .....
   a. it exists in three states.
   b. it has high boiling point.
   c. its density decreases on freezing.
   d. it is a non-polar compound.
2. Water molecule consists of .....
   a. two atoms of three different elements.
   b. three atoms of two different elements.
   c. three atoms of three different elements.
   d. four atoms of two different elements.

B. What is the importance of Hofmann's voltameter ? *(South Sinai 2020)*

.....

2. A. Complete the following statements :

1. Water is considered as a good ..... solvent, as it dissolves most .....compounds.
2. The density of water in ..... state is lower than its density in ..... state.
3. Water molecule consists of ..... atoms and ..... atom.
4. The bond between water molecules is called ..... bond. *(Akhnaton Sch. / Cairo 2020)*
5. Increasing the boiling point of water is due to the presence of .....

B. What is meant by hydrogen bond ?

.....

.....

3. A. What happens when ... ?

The temperature of water decreases below 4°C.

.....

.....

B. Put (✓) or (✗), then correct what is wrong :

1. Table salt and sugar are from covalent compounds.
   ( ) .....

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2. The angle between the two single covalent bonds in water molecule is 104.5°
( ) .....

3. Hydrogen bond is weaker than covalent bond.
( ) .....

4. A. Write the scientific term :

1. The bond between hydrogen atom and oxygen atom in water molecule.
(El-Gharbia 2020) (.....)

2. The type of bond which links the molecules of water together.
(Leaders Sch. / Alexandria 2020) (.....)

3. The positive pole of Hofmann's voltameter. (.....)

B. Give reasons for :

1. Ice floats on water surface.
.....

2. Adding drops of dilute acid to water during its electrolysis.
.....

3. The closed glass bottle filled with water is broken when it is put in freezer.
.....

4. Sugar dissolves in water although it is a non-polar compound. *(Essmat Sch. / Alexandria 2020)*
.....

5. Pure water doesn't effect on both of litmus paper.
.....

C. From the opposite figure , answer the following questions : *(Lycee El-Haram Sch. / Giza 2020)*

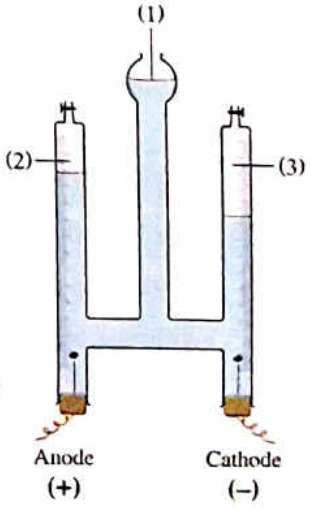
1. What is the name of this apparatus?
.....

2. Label the numbers (1) , (2) and (3).
(1) ..... (2) ..... (3) .....

3. What happens if a glowing splint is put above the anode and the cathode?
* Above the anode, ...
* Above the cathode, ...

4. Write the balanced equation of this process.
(Science Inspectorate / Dakahlia 2022)
.....

5. Calculate the volume of the gas that evolves at the anode, if the volume of the gas that evolves at the cathode is 20 cm^3.
(Heliopolis Modern Lang. Sch. / Cairo 2022)
.....



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Worksheet 11

1. Explain what happens when ... ?

1. Storing the tap water in empty plastic bottles.

.....

.....

2. Water is mixid with the wastes of man and animal. *(Borg El-Arab Zone. / Alexandria 2020)*

.....

.....

2. Complete the following :

1. Mixing of animals and human wastes with water leading to the infection with many diseases such as ..... , ... and .....
2. Increasing the mercury concentration in drinking water causes ..... , while increasing arsenic concentration in it, increases the infection rate of .....
3. We must ..... the drinking water tanks and don't store the tap water in ..... bottles.
4. Eating fish contain high concentration of lead causes the .....
5. The nuclear reactors cause both ..... and ..... pollution for water. *(El-Menofia 2020)*

3. A. 1. Nuclear reactors cause thermal water pollution and radiant water pollution. Explain.

.....

.....

.....

.....

2. How to protect water from pollution ? (Two points only).

.....

.....

B. Write the scientific term :

1. A kind of water pollution which results from mixing of humans and animals wastes with water. (.....)
2. A kind of water pollution which results from discharging factories wastes and sewage in rivers and seas. (.....)
3. A water pollutant which causes the death of brain cells.

(El-Menofia 2020) (.....)

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4. A. What is meant by water pollution ? *(Port Said 2020)*

.....

.....

B. Put (✓) or (✗), then correct what is wrong :

1. Volcanic eruptions and lightning accompanied by thunder storms are from artificial environmental pollutants.

( ) .....

2. Adding of chemical fertilizers to water causes water pollution.

( ) .....

3. Storing the tap water in plastic bottles causes the increase of infection with hepatitis.

( ) .....

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General Exercise of the School Book on Unit One

1. Choose :

1. Scientist ..... discovered the main energy levels in the atom.

a. Bohr b. Mendeleev c. Moseley d. Hofmann

2. Sodium oxide is from ..... oxides.

a. amphoteric b. acidic c. nonmetallic d. basic

3. All of the following elements are from semi-metals except .....

a. tellurium. b. silicon. c. boron. d. bromine.

4. The strongest metal lies in the ..... group.

a. 2A b. 1A c. 1B d. 7A

2. What is meant by ...?

1. Chemical activity series :

.....

2. Water pollution :

.....

3. Semi-metals :

.....

3. How can you differentiate between magnesium oxide and sulphur oxide ?

.....

.....

4. What is the importance of ... ?

1. Liquefied nitrogen : .....
2. Sodium in liquid state : .....
3. Water : .....

5. Give reasons for :

1. The use of radioactive cobalt 60 in food preservation.

.....

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2. Elements of the same group have similar properties.

.....

3. The boiling point of water is high.

.....

4. Alkali metals are kept under kerosene in the lab.

.....

6. What is the effect of the following on the water environment ?

1. Drainage of factories wastes in rivers and seas.

.....

2. Using of rivers and seas water as a renewable source for cooling the nuclear reactor.

.....

3. Mixing of animal and man wastes with water.

.....

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Model Exams on Unit 1

Model Exam 1

56

Answer the following questions :

Question 1 14 marks

A Choose the correct answer :

1. Pure water at the normal atmospheric pressure boils at .....°C

   a. 50 b. 90 c. 100 d. 10

2. Polar water molecules are linked together by ..... bonds.

   a. hydrogen b. covalent c. ionic d. no correct answer

3. Element ..... has the properties of both metals and nonmetals.

   (Ashmoon Zone / El-Menofia 2020)

   a. Na b. Cl c. B d. Ne

4. The number of elements in Mendeleev's periodic table is ..... elements.

   a. 92 b. 118 c. 76 d. 67

B The opposite table represents a section of the modern periodic table on which the atomic sizes of some elements are recorded :

N	O	F
.....	66	.....
P	S	Cl
.....	104	99

1. Complete the spaces in the table with the following numbers : (110 / 70 / 64)

2. **Choose :**

   The difference between the size of phosphorus atom and fluorine atom = 46 .....

   (Nanometre - Micrometre - Picometre - Angestrom). *(Manaret Sch. / Cairo 2020)*

C Mention the atomic number of an element (X) that locates in group zero and period three.

(El-Tur Zone. / South Sinai 2020)

.....

Question 2 14 marks

A Correct the underlined words :

1. Pure water is a **good** conductor of electricity. (.....)
2. The **cathode** is the positive pole in Hofmann's voltameter. (.....)
3. **Moseley** discovered that the nucleus of the atom contains positively charged protons. *(Borg El-Arab Sch. / Alex. 2020)* (.....)
4. **Liquefied nitrogen** is used in food preservation. (.....)

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B Write the scientific term :

1. The descending arrangement of elements according to their chemical activity.
(Port Said Directorate / Port Said 2022) (.....)
2. A type of weak electrostatic attraction arises between the molecules of some polar compounds. *(Manaret Sch. / Cairo 2020)* (.....)
3. The block that contains the series of lanthanides and actinides.
(St. Joseph Sch. / Cairo 2020) (.....)
4. A good polar solvent for most of ionic compounds.
(St. Joseph Sch. / Cairo 2020) (.....)

C Give reason for :

The volume of water increases on decreasing its temperature than 4°C.

.....

.....

Question 3 *14 marks*

A Complete the following sentences :

1. Liquid ..... is used in the transferring ..... from inside the nuclear reactor to outside.
2. Acidic oxides dissolve in water forming ..... while basic oxides forming .....
3. Nuclear reactors cause both of ..... water pollution and ..... water pollution.
4. Both of ..... and ..... are examples of nonmetals.

B Choose from column (B) what suits it in column (A) : *(Manaret Sch. / Cairo 2020)*

(A)	(B)
1. Liquid sodium	a. is used in preservation of food.
2. Liquefied nitrogen	b. is used in manufacture of electronic devices.
3. Cobalt 60	c. is used in nuclear reactors.
4. Silicon slides	d. is used in preservation of cornea of the eye.
	e. kept alkali metals under its surface.

1. ..... 2. ..... 3. ..... 4. .....

C Mention an example of a metalloid used in the manufacture of electronic devices and an example of a transition element used in food preservation.

.....

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Question 4 14 marks

A Put (✓) or (✗) :

1. The modern periodic table consists of 17 horizontal periods and 8 vertical groups. ( )
2. Solutions of metal oxides turn blue litmus paper into blue. *(Dream Sch. / Giza 2020)* ( )
3. Sodium is used in the manufacture of electronics. *(Bloom Sch. / Giza 2020)* ( )
4. Hofmann's voltameter is used for water electrolysis. *(Essmat Sch. / Alex. 2020)* ( )

B What happens when ... ?

1. Dumping the atomic wastes in oceans and seas.

.....

2. Adding dil. HCl to a piece of carbon. *(Manaret Alfarouk Sch. / Cairo 2020)*

.....

C The River Tufdal in Norway was famous for the migration of salmon fish in a specific season of each year. It was noticed that the migration of these fish was stopped after construction of several factories on both banks and the dependence of farmers in its vicinity on chemical pesticides in resisting agricultural pests.
What is your explanation for stopping the migration of fish in the light of these previous conditions ?

.....

.....

.....

Model Exam 2 56

Answer the following questions

Question 1 14 marks

A Complete the following sentences :

1. The modern periodic table consists of ..... horizontal periods.
2. Elements ..... , ... and ..... are examples of halogens.
3. $Mg + 2HCl \xrightarrow{dil.}$ ..... + ...
4. In Hofmann's voltameter ..... is the positive pole, while ..... is the negative pole.

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B Illustrate with chemical equations only the reactions of the following :

1. Reaction of magnesium with dilute hydrochloric acid.

.....

2. Reaction of carbon with oxygen.

.....

C What happens when ... ?

An element loses an electron. *(Essmat Abd El-Mageed Sch. / Alex. 2020)*

.....

Question 2 14 marks

A Put (✓) or (✗) :

1. The angle between two single covalent bonds of water is 104.5° ( )
2. Bohr discovered the seven main energy levels in the known heaviest atom. *(Science Inspectorate Kafr El-Sheikh 2020)* ( )
3. The boiling point of liquefied nitrogen is (–196°C). ( )
4. Each period in the modern periodic table starts with inert gas. ( )

B Give reasons for :

1. It is dangerous to eat fish containing high concentration of lead.

.....

.....

2. Both nitrogen and lithium are located in the same period.

.....

.....

C Mention the difference between chlorine and bromine (concerning : the physical state).

.....

Question 3 14 marks

A Choose the correct answer :

1. The elements of modern periodic table are classified into .....

a. one block. b. two blocks. c. three blocks. d. four blocks.

2. Formation of ..... occurs when an atom of nonmetallic element gains an electron or more during chemical reactions.

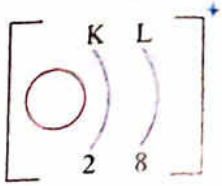
a. positive ion b. negative ion c. excited atom d. metal atom

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3. Element ..... is used in preservation of cornea of the eye.
   a. silicon b. radioactive cobalt 60
   c. liquefied nitrogen d. liquid sodium

4. If the summation of volumes of gases in Hofmann's voltameter is 60 cm^3, so the volume of hydrogen gas and oxygen gas respectively equals .....
   a. 20 , 40 b. 40 , 20 c. 30 , 30 d. 10 , 50

B The opposite figure shows the electronic configuration of the ion of an element :



Complete :

1. The number of the period where this element belongs to is .....
2. The block where this element belongs to is .....
3. The type of the element is .....
4. The nearest inert gas to this element is .....

C What is the importance of liquid sodium. *(Degla Valley Sch. / Cairo 2020)*

.....

Question 4 — 14 marks

A The opposite figure represents the second period and the third period in the modern periodic table :

	1A	2A	3A	4A	5A	6A	7A	0
Second period	A	Y		Q		D		Z
Third period	X	B					C	

[NB. The letters in the table don't represent the actual symbols of elements]

Complete the following :

1. The name of the element (A) is .....
2. The chemical formula for the compound produced from combination of element (X) with element (C) is .....
3. The type of oxide of element (Q) is .....
4. The physical state of element (C) at room temperature is .....

B Compare between elements of group (1A) and group (7A) concerning (Name – Valency – Kind of formed ions – Block).

Points of comparison	Elements of group (1A)	Elements of group (7A)
Name :	.....	.....
Valency :	.....	.....
Kind of formed ions :	.....	.....
Block :	.....	.....

C If you have an element with 2 electrons in the first energy level, and 7 electrons in second energy level.
What is the atomic number of this element, and mention if it is a metal or a nonmetal.

.....

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UNIT 2

Lesson One

The Atmospheric Layers

Worksheet 12

1. A. Choose the correct answer :

1. The device which is used in measuring the altitude above sea level is the .....
   a. altimeter. b. aneroid. c. thermometer. d. Hofmann's voltameter.

2. The density of air ..... by increasing the elevation above the sea level.
   a. increases b. decreases c. doesn't change d. is doubled

3. The..... is a layer extends from the sea level to the tropopause.
   a. troposphere b. stratosphere c. mesosphere d. thermosphere

4. The..... is a layer extends from stratopause to mesopause. *(St. Joseph Sch. / Cairo 2020)*
   a. troposphere b. stratosphere c. mesosphere d. thermosphere

5. The atmospheric pressure on the top of a mountain is ..... the atmospheric pressure at the sea level.
   a. more than b. less than c. equal to d. half

6. The..... is located between stratosphere and mesosphere. *(Bloom Sch. / Giza 2020)*
   a. tropopause b. stratopause c. mesopause d. thermopause

B. Problem :

If the temperature at the foot of Everest mountain is 20.6°C. Find the temperature at its top of height 8862 m above Earth's surface. *(El-Helmia Official Lang. Sch. / Cairo 2022)*

.....

.....

2. Give reasons for :

1. Most of weather conditions take place in troposphere layer.

.....

2. The troposphere layer regulates the Earth's temperature.

.....

3. The atmospheric pressure in troposphere layer decreases on going above sea level. *(St. Joseph Sch. / Cairo 2022)*

.....

4. The air motion is vertical in the troposphere layer. *(El-Tur Zone / South Sinai 2020)*

.....

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3. Complete the following statements :

1. The thickness of troposphere layer is about ..... *(St. Joseph Sch. / Cairo 2020)*
2. As we go up 1 km above the sea level, the temperature ..... with .....
3. Most weather features occur in ..... *(Akhnaton Egyption Sch. / Cairo 2020)*
4. Troposphere layer contains about ..... of the total mass of the atmospheric air and about ..... of the total amount of atmospheric water vapour.
5. The aneroid is used to .....
6. The ..... is a device used to measure the altitude of aeroplanes above sea level.

4. A. 1. Compare between :

The atmospheric pressure and the atmospheric envelope [in the view of definition].

The atmospheric pressure	The atmospheric envelope
.....	.....
.....	.....
.....	.....

2. Calculate the height of a mountain if the temperature at its foot is 19°C a at its top is 6°C.

.....

B. Arrange :

1. The layers of atmospheric envelope [starting from the higher pressure to the lower pressure].

.....

2. The atmospheric layers [starting from the farthest to the Earth's surface].

.....

C. Put (✓) or (✗), then correct what is wrong :

1. There is about 50% of the total mass of atmospheric air in the area between sea level and 3 km height. ( )

.....

2. The normal atmospheric pressure at sea level equals 76 mbar. ( )

.....

3. Troposphere layer contains most of atmospheric turbulences. ( )

.....

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Worksheet 13

1. A. Complete the following statements :

1. The thickness of stratosphere is ..... , while that of mesosphere is .....
2. Luminous ..... are formed in mesosphere layer due to its friction with .....
3. The highest temperature layer in the atmosphere is ..... and the lowest temperature one is ..... *(Degla Valley Sch. / Cairo 2020)*
4. Ozone layer is located in ..... layer. *(Eng/M.M Yacoub formal Sch. / Aswan 2020)*
5. Van-Allen Belts surround .....

B. What is meant by ... ?

1. Aurora phenomenon : ..... *(Qus official Sch. / Qena 2020)*

.....

2. Van-Allen Belts : .....

.....

3. Exosphere region : .....

.....

4. Ionosphere : .....

.....

C. What happens when harmful cosmic radiations reach the ionosphere ?

(El-Gharbia 2020)

.....

2. A. The opposite figure exhibits the temperature changes in the layers of atmospheric envelope :

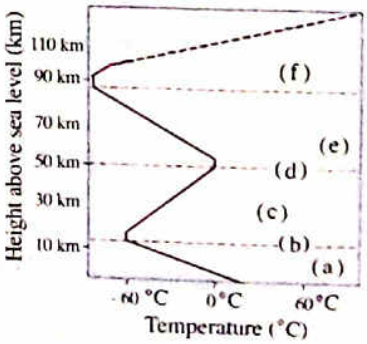
(Eng/M.M Yacoub formal Sch. / Aswan 2020)

Write the suitable labels that are represented by letters on the figure :

a. ..... b. .....

c. ..... d. .....

e. ..... f. .....



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B. Put (✓) or (✗), then correct what is wrong :

1. Satellites orbit around the Earth in exosphere region. ( )

.....

2. The air moves horizontally in the lower part of stratosphere. ( )

.....

3. Troposphere is important for wireless communication. ( )

.....

4. Ozone layer is found in thermosphere layer. ( )

.....

C. 1. Compare between :

The troposphere layer and the mesosphere layer [in the view of : pressure and temperature]

P.O.C.	The troposphere layer	The mesosphere layer
- Pressure :	.....	.....
- Temperature :	.....	.....

2. What is the importance of Van-Allen Belts ? *(Lycee El-Haram Sch. / Giza 2020)*

.....

3. A. Give reasons for :

1. The lower part of stratosphere is suitable for flying aeroplanes. *(Manaret Al Farouk Islamic Sch. / Cairo 2020)*

.....

2. Ionosphere plays an important role in communication. *(East Mansoura Zone. / El-Dakahlia 2020)*

.....

3. The temperature increases as we go higher in stratosphere layer.

.....

4. The stratosphere layer is called the ozonic atmospheric envelope.

.....

5. The upper part of thermosphere is called ionosphere.

.....

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B. Compare between : Troposphere and stratosphere layers. (concerning : thickness and air movement) *(Port Said Zone. / Port Said 2020)*

P.O.C.	Troposphere layer	Stratosphere layer
- Thickness :	.....	.....
- Air movement :	.....	.....

4. A. What is the importance of ... ?

1. Ozone layer : ..... *(Damietta 2020)*
2. Satellites : .....
3. Thermosphere : .....

B. Choose the correct answer :

1. The planes fly in ..... layer.
   a. troposphere b. stratosphere c. mesosphere d. thermosphere
2. ..... layer extends from tropopause to stratopause.
   a. Troposphere b. Stratosphere c. Mesosphere d. Thermosphere
3. Charged cosmic radiations reflect in ..... layer.
   a. troposphere b. stratosphere c. mesosphere d. ionosphere
4. Ionosphere is surrounded by two ..... belts. *(Sherif Talat Sch. / El-Sharkia 2020)*
   a. magnetic b. ionic c. electric d. heat
5. Meteors are formed in ..... layer. *(Manaret Heliopolis Sch. / Cairo 2020)*
   a. mesosphere b. ionosphere c. exosphere d. stratosphere

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UNIT 2

Lesson Two

Erosion of Ozone Layer and Global Warming

Worksheet 14

1. Put (✓) or (✗) :

1. The ozone molecule is formed by bonding free oxygen atom with an oxygen molecule. ( )
2. Ozone layer extends from 20 km to 30 km height above the sea level. ( )
3. Far ultraviolet rays penetrate the ozone layer with a percentage 100% ( )
4. Erosion of ozone layer and global warming phenomenon are from the dangerous phenomena that face planet Earth atmosphere. *(Bloom Sch. / Giza 2020)* ( )

2. Write the scientific term :

1. A type of ultraviolet radiations that is absorbed completely (100%) by the ozone layer. *(Damietta directorate / Damietta 2022)* (.....)
2. Thinning or losing parts of ozone layer. *(Egypt Dream Lang. Sch. / Cairo 2022)* (.....)
3. A useful gas for the planet Earth, that is formed in the stratosphere layer. (.....)
4. A unit measures the degree of ozone. *(Leaders Shc. / Alex. 2020)* (.....)

3. A. Explain by equations the role of ultraviolet radiations in the formation of ozone gas.

.....

.....

B. 1. What is meant by standard temperature and pressure ?

.....

.....

2. What is the importance of ozone layer ? *(St. Joseph Sch. / Cairo 2020)*

.....

.....

4. A. Complete the following sentences :

1. The ozone layer absorbs the ..... rays away from the Earth's surface.
2. The type of ultraviolet rays that penetrates the ozone layer with a percentage 100% is .....
3. Nanometre = ... m.
4. In ..... each year, erosion of ozone layer increases above the ..... pole.

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B. Give reasons for :

1. Increasing the size of ozone hole in September every year.

.....

.....

2. Formation of ozone layer in the stratosphere layer. *(Ashmoon Zone El-Menofia 2020)*

.....

.....

Worksheet 15

1. Mention :

1. The reasons for increasing CO_2 gas ratio in the atmosphere.

.....

.....

2. The use of halons.

.....

2. A. What is meant by ... ?

• IPCC : .....

.....

B. Choose the correct answer :

1. ..... is/are used as cooling substance in cooling devices.

a. Freon b. Halons

c. Nitrogen oxides d. Methyl bromide gas

2. ..... result(s) from the burning of fuel of ultrasound aeroplanes (concorde).

a. Methyl bromide gas b. Nitrogen oxides gases

c. Halons d. Freon

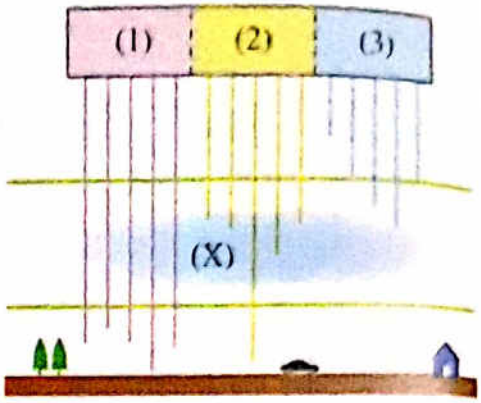
3. ..... is/are used as an insecticide to preserve stored agricultural crops.

a. Nitrogen oxides gases b. Freon

c. Methyl bromide gas d. Halons

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3. A. From the opposite figure :



1. What do the rays (1) , (2) and (3) represent ?
2. What is the thickness of layer (X) ?

B. What happens when overuse of freon ?

(El-Salam Sch. / Luxor 2020)

.....

4. A. Put (✓) or (✗), then correct what is wrong :

1. Methyl bromide is used in extinguishing fires. ( )

.....

2. Methane gas and nitrous oxide gas are considered from greenhouse gases. ( )

.....

3. Halogens are produced from ultrasound aeroplanes. ( )

.....

B. Mention the pollutants of ozone layer.

.....

.....

.....

Worksheet 16

1. A. What would happen if ... ?

1. Earth's temperature increases [concerning : the climatic changes].

.....

2. The melting rate of polar ice is increased [concerning : the coastal areas].

.....

3. The percentage of nitrogen oxides gases in the atmospheric envelope increases.

.....

4. Infrared radiations don't reemit back from troposphere layer.

.....

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B. What is meant by greenhouse effect ? *(Damietta 2020)*

.....

.....

2. Complete the following statements :

1. Both of ..... and ..... are from the examples of the climatic changes produced by global warming.
2. The ultraviolet radiation has a ..... effect, while the infrared radiation has a ..... effect. *(Thebes International Sch. / Giza 2020)*
3. The glass permits the passage of ..... and ..... rays coming from the Sun to be absorbed by Earth in the greenhouse.
4. Global warming phenomenon means .....

3. A. Give reasons for :

1. Melting of ice and snow of both south and north poles.

.....

2. Infrared radiation cannot penetrate the Earth's atmosphere.

.....

3. Burning of fossil fuel should be reduced.

.....

4. Increasing CO_2 gas percentage in the atmosphere. *(Leaders lang. Sch. / Cairo 2022)*

.....

B. Choose the correct answer :

1. Global warming happens due to all the following reasons except .....
   a. the lack of CO_2 in the atmospheric envelope.
   b. the increase of the amount of CO_2 in the atmospheric envelope.
   c. the lack of plants on Earth.
   d. the burning of fossil fuel.

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2. The erosion of the ozone layer differs from a year to another due to .....

a. increasing the amount of pollutants.

b. the lack of plants on the Earth.

c. the lack of CO_2 in the atmospheric envelope.

d. the lack of ozone gas in the atmospheric envelope.

3. The increase of CO_2 percentage is caused by all of the following reasons except .....

a. cutting trees.
b. burning forests.
c. burning fossil fuel.
d. increasing green areas.

4. Melting of ice in the north and south poles leads to the extinction of polar animals like .....

a. crocodiles.
b. deers.
c. monkeys.
d. polar bears.

5. Ozone layer doesn't allow the passage of all ..... ultraviolet rays.

a. far
b. medium
c. near and medium
d. far and medium

(El-Salam Sch. / Luxor 202)

6. All of the following gases are greenhouse gases, except .....

a. CO_2
b. O_2
c. N_2O
d. CH_4

(Montazah Directorate / Alex. 2022

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General Exercise of the School Book on Unit Two

1. Replace each of the following statements by a suitable scientific term :

1. The boundary separating between stratosphere and mesosphere where temperature is rather constant. (.....)
2. Charged layer reflects radio waves. (.....)
3. One of the atmosphere components that its ratio increased in recent years to reach about 0.038 % (.....)
4. A type of ultraviolet radiation that is absorbed completely (100%) in the ozone layer. (.....)

2. Complete the following phrases :

1. The highest temperature layer in the atmosphere is ..... and the least temperature one is .....
2. Most of weather features occur in ..... layer, whereas satellites revolve through the ..... layer.
3. Ultraviolet radiation has a ..... effect, and the infrared radiation has a ..... effect.
4. Among the pollutants of the ozone layer are ..... compounds that are used in air conditioning sets, and ..... compounds that are used in fire extinguishers.

3. Illustrate with formulas only the role of ultraviolet radiation in the formation of ozone gas.

.....

.....

4. An aeroplane captain announced that the atmospheric pressure outside the aeroplane is 90 millibar. In which layer of the atmosphere was the plane flying ? Why ?

.....

.....

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5. Compare between mesosphere and thermosphere in terms of temperature, importance and air pressure.

P.O.C.	Mesosphere	Thermosphere
• Temperature :	.....	.....
• Importance :	....	....
• Air pressure :	.....	.....

6. Calculate the height of a mountain if the temperature at its foot is 30°C and at its top is (– 6°C).

.....

.....

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Model Exams on Unit 2

Model Exam 1

56

Answer the following questions :

Question 1 14 marks

A Choose the correct answer :

1. Troposphere contains about ..... % of the total mass of atmospheric air.

a. 50 b. 60 c. 75 d. 90

2. ..... layer is surrounded by Van-Allen Belts.

a. Troposphere b. Stratosphere c. Ionosphere d. Mesosphere

3. Pilots prefer to fly in the ..... of stratosphere layer.

a. upper part b. lower part c. front d. middle part

4. ..... gas is produced from the reaction between sodium bicarbonate and vinegar.

a. CH_4 b. N_2O c. H_2O d. CO_2

B Correct the underlined words :

1. **Troposphere** is the coldest layer. (.....)

(Akhnaton Egyptian Sch. / Cairo 2020)

2. Luminous meteors are formed in the **troposphere** layer. (.....)

3. **Methyl bromide** used in extinguishing fires. (.....)

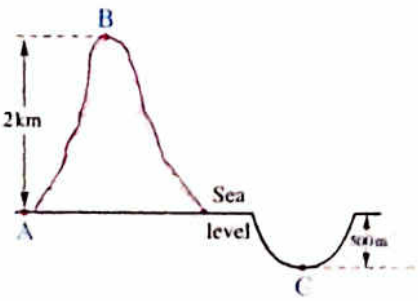
(Manaret Heliopolis Sch. / Cairo 2020)

4. **Ultraviolet** radiation has thermal effect. (.....)

C From the opposite figure :

Calculate the temperature at points (A), (B) and (C).

If you know that the temperature at the middle of the mountain is 0°C.



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Question 2 14 marks

A Put (✓) or (✗) :

1. Chlorofluorocarbon compounds are dangerous to the environment. ( )
2. Van-Allen Belts are called by this name related to the aurora phenomenon. ( )
3. Mesosphere is called thermal layer. ( )
4. Radio waves are reflected at troposphere layer. *(El-Tur Zone. / South Sinai 2020)* ( )

B Give reasons for :

1. Van-Allen Belts play an important role in protecting the Earth.

.....

2. The upper part of thermosphere layer is called ionosphere.

.....

C What is meant by global warming phenomenon ? *(Minia official Lang. Sch. / Minia 2022)*

.....

.....

Question 3 14 marks

A Complete the following sentences :

1. All of ..... , ... and forests fires are the reasons of increasing greenhouse gases percentage in the atmosphere.
2. Wind moves from the areas of ..... atmospheric pressure to that of ..... atmospheric pressure.
3. The air movement in ..... layer is vertical, while in ..... layer is horizontal.
4. In the atmospheric envelope, the ..... is the fourth layer and also it is called ..... layer, because it is the hottest layer in the atmospheric envelope.

B What happens when ... ?

1. We go up above sea level [concerning the atmospheric pressure].

.....

2. Oxygen atom combines with oxygen molecule.

.....

C Mention the importance of the ionosphere.

.....

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Question 4 — 14 marks

A Write the scientific term :

1. Charged layer which reflects radio waves. (.....)

(Manaret El Farouk Islamic Sch. / Cairo 2020)

2. A phenomenon looks like a colorful light curtains seen in the two poles. (.....)

(St. Joseph Sch. / Cairo 2020)

3. The region in which the atmospheric envelope is inserted in the outer space. (.....)

(Degla Valley Sch. / Cairo 2020)

4. It is the trapping of infrared radiation in the troposphere layer. (.....)

(Manaret Heliopolis Sch. / Cairo 2020)

B Choose the odd word out and write the relation between each of the others :

1. Oxygen / Nitrous oxide / Water vapour / Carbon dioxide. *(El-Gharbia 2020)*
2. Nitrogen oxides / water vapour / freons / Halons. *(El-Tur Zone. / South Sinai 2020)*
3. Destructive floods / Forests fires / Drought waves / Greenhouse effect.
4. Stratopause / Tropopause / Mesopause / Thermosphere.

C Stratosphere is called the ozonic atmospheric envelope because it contains the ozone layer. What are the changes that will occur in the temperature of troposphere and stratosphere in the absence of ozone layer **(Explain your answer)**.

.....

.....

Model Exam 2 — 56

Answer the following questions :

Question 1 — 14 marks

A Complete the following statements :

1. The most known greenhouse gases are ....., CFC_s, ... and nitrous oxide gas.
2. The ..... don't penetrate ozone layer by a percentage 95 %, while ..... penetrates ozone layer by a percentage 100 %.
3. Scientist ..... postulated that the thickness of the ozone layer if it is compressed, it will be .....
4. Ozone layer is extends from ..... to ..... km above sea level.

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B Give one example of each of the following :

1. Greenhouse gases : .....

(Degla Valley Sch. / Cairo 2020)

2. Barometers : .....

(El-Salam Sch. / Luxor 2020)

3. Pollutants of ozone layer : .....

(Leaders Sch. / Alex. 2020)

4. Severe climatic changes : .....

C Compare between troposphere and mesosphere layers (according to there importance) :

Troposphere layer	Mesosphere layer
.....	.....
.....	.....
.....	.....
.....	.....

Question 2 *14 marks*

A Choose the correct answer :

1. ..... is the region between mesosphere and thermosphere.

a. Tropopause b. Stratopause c. Mesopause d. Thermopause

2. 1 bar = ... millibar (mbar).

a. 100 b. 10 c. 1000 d. 500

3. ..... is/are used as a flating substance in making foam backing.

a. Chlorofluorocarbon compounds b. Nitrogen oxides gases

c. Methyl bromide gas d. Halons

4. The thickness of stratosphere layer is ..... km.

a. 1000 b. 13 c. 50 d. 37

B Write the scientific term :

1. It is a type of ultraviolet rays that doesn't penetrates the ozone layer by a percentage 100 %. (.....)

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2. A device used to determine the possible day weather based on atmospheric pressure.

(Borg El-Arab Zone. / Alex. 2020) (.....)

3. The weight of air column of an atmospheric height on a unit area. (.....)

(Shebien El-Koum Directorate / Menofia 2022)

4. Curved lines that join the points of equal pressure in atmospheric pressure maps. *(Science Inspectorate / Gharbia 2022)* (.....)

C Give reasons for :

The stratosphere layer is called the ozonic atmospheric envelope.

.....

Question 3 14 marks

A Correct the underlined words :

1. Water vapour is from **ozone pollutants**. (.....)
2. The temperature of the Earth increases due to the increase in the percentage of **oxygen** gas in the atmosphere than normal. (.....)
3. The thickness of mesosphere layer is **50 km**. (.....)
4. **Troposphere** is surrounded by to magnetic belts. (.....)

B What happens when ... ?

1. There are no Van-Allen Belts.

.....

2. Overuse of freon.

.....

C If the temperature at the top of a mountain is (– 4°C) and at a point in the middle of its height is (9°C).

Calculate : 1. The height of the mountain.

2. The temperature at the foot of the mountain.

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Question 4 14 marks

A Put (✓) or (×) :

1. Infrared radiation has a chemical effect. *(Manaret Heliopolis Sch. / Cairo 2020)* ( )
2. Methyl bromide gas is used as an insecticide. *(Bloom Sch. / Giza 2020)* ( )
3. Temperature decreases by 6.5°C at 2 km above sea level. ( )

(Essmat Abd El-Mageed Sch. / Alex. 2020)

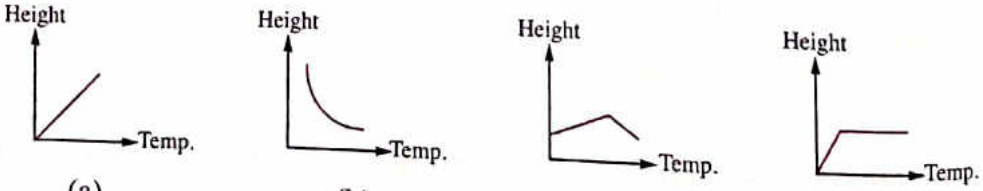
4. The millibar is the unit of measuring the ozone degree. *(El-Salam Sch. / Luxor 2020)* ( )

B Choose from column (B) what suits it is column (A) :

(A)	(B)
1. Van-Allen belts	a. revolve around the Earth in a region called the exosphere.
2. Altimeter	b. are responsible for scattering the harmful cosmic rays away from the Earth.
3. Satellites	c. is a brightly coloured light curtains seen at the both poles of the Earth.
4. Aurora phenomenon	d. is used to measure the elevation of aeroplane above sea level.
	e. is used to determine the possible day weather.

1. ..... 2. ..... 3. ..... 4. .....

C Mention the change in temperature by transferring 7500 metres upwards then choose the correct diagram to illustrate your answer : *(Manaret El-Farouk Islamic Sch. / Cairo 2020)*



(a) (b) (c) (d)

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UNIT 3

Lesson One

Fossils

Worksheet 17

1. Choose the correct answer :

1. Which of the following terms is the most accurate expression for the traces and remains of old living organisms that were preserved in sedimentary rocks ? .....

a. Extinction. b. Red list. c. Fossils. d. Petrification.

2. All the following are suitable conditions for fossil formation of any organism except that it .....

a. has a hard skeleton.

b. has a medium to protect it from decomposition.

c. buried immediately after death. d. has a soft body.

3. What is the kind of fossil that is formed when a plant leaf falls on a soft sedimentary rock at the beginning of formation, then hardening ? .....

a. Trace. b. Mold. c. Cast. d. Petrified fossil.

4. Mammoth fossil is an example of ..... fossil. *(El-Salam Sch. / Luxor 2020)*

a. cast b. mold c. complete body d. petrified

2. A. What is the difference between ... ?

1. Mammoth fossil and amber fossil :

Mammoth fossil	Amber fossil
.....	.....
.....	.....
.....	.....

2. Cast and mold : *(M.M Yacoub Formal Lang. Sch. / Aswan 2022)*

Cast	Mold
.....	.....
.....	.....
.....	.....

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B. Mention :

1. One example for complete body fossil : ..... *(Dream International Sch. / Giza 2020)*
2. The suitable conditions for fossils preservation : .....
.....
3. One example for the trace : ..... *(Akhnaton Egyptian Sch. / Cairo 2020)*

3. A. Mention the name and the type of each fossil illustrated in the following figures :



Fig. (I)

.....
.....



Fig. (2)

.....
.....



Fig. (3)

.....
.....

B. What is meant by ... ?

1. Amber : .....
2. Petrification : .....
.....
3. Fossils : ..... *(Sherif Talat Sch. / El-Sharkia 2020)*
.....

4. A. Give reasons for :

1. The petrified woods are considered from fossils although they look like rocks.

(Eng/M.M Yacoub Formal Sch. / Aswan 2020)

.....

2. Naming the area of the petrified forests with wood mountain.

(East Mansoura Zone. / El-Dakahlia 2020)

.....

3. Amber is considered as a suitable medium for formation of complete body fossils.

.....

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B. Complete the following sentences :

1. The suitable medium for formation the mammoth fossil is .....
2. The first mammoth fossil was discovered in ..... century which keeps the .....
3. When the snail shell of ammonites decomposes, it will leave ..... which carries the ..... details for the snail.
4. The resinous matter is secreted from ..... which were common during some old geological ages.
5. Fossils always exist in the ..... rocks.

Worksheet 18

1. A. Complete the following statements :

1. The presence of microfossils as radiolaria and foraminifera in the rocks of the exploratory wells points to the ..... of rocks existed in them and the suitable conditions of ..... formation.
2. Archaeopteryx represents the link between ..... and .....

(Borg El-Arab Zone. / Alex. 2020)

3. Fossils are important for studying ..... and figuring out the .....
4. ..... fossil is present in ..... rocks of El-Mokattam mountain.

B. What is meant by index fossils ? *(Damietta 2020)*

.....

.....

2. Correct the underlined words :

1. Petrified woods are considered from **rocks**. *(Manaret Heliopolis Sch. / Cairo 2020)* (.....)
2. **Nummulites** fossil is used in determination the age of sedimentary rocks. (.....)
3. **Ammonites** fossils indicate that the environment where they lived was clear warm shallow seas. (.....)
4. Ferns fossils indicate that the environment where they lived was **a sea floor**. *(Ashmoon Zone / El-Menofia 2020)* (.....)
5. The trace is what the living organism leave **after its death** in the sedimentary rocks. (.....)
6. Worms' tunnels fossil is from **remains** of old living organisms. (.....)

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3. A. Give reasons for :

1. Geologists search for foraminifera and radiolaria fossils.

.....

.....

2. El-Mokattam mountain was a part of a sea floor more than 35 million years ago.

(Agamy Directorate / Alex. 2022

.....

.....

B. Mention one use for :

1. Index fossils.

.....

2. Fossils.

.....

4. A. choose the correct answer :

1. Not all the fossils are considered index fossils, because they are characterized by .....
   a. a long period of time and a limited geographic distribution.
   b. a short period of time and a wide geographic distribution.
   c. a long period of time and a wide geographic distribution.
   d. a short period of time and a limited geographic distribution.

2. The fossil record points to the evolution of life from simple to complex in the plants and the proof is that .....
   a. the angiosperms appeared before gymnosperms.
   b. the ferns appeared before mosses.
   c. the algae appeared before mosses and ferns.
   d. the mosses appeared before the algae.

3. The fossils that exist in the sedimentary rocks of El-Mokattam mountain are ..... fossils.
   a. ferns b. coral c. nummulites d. ammonites

4. ..... is an example of microfossils. *(Manaret Al Farouk Islamic Sch. / Cairo 202*
   a. Mammoth b. Fern c. Foraminifera d. Coral

B.

(A)	(B)
1. Fossils indicate the details of the life of an old plant.	a. Radiolaria.
2. A fossil indicates the suitable conditions of petroleum formation.	b. Archaeopteryx.
3. A fossil is considered a link between reptiles and birds.	c. Corals.
4. Invertebrates fossils were appeared before vertebrates on the life stage.	d. Petrified woods.
	e. Dinosaurs.

1. ..... 2. ..... 3. ..... 4. .....

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Extinction

Worksheet 19

1. A. Correct the underlined words :

1. **The violent Earth movement** is one of the most important causes of extinction in recent ages. (.....)
2. **Quagga** is from the most famous extinct species in the old times. (.....)
3. **Dinosaur** is considered from the extinct species in the recent times. (.....)
4. **Passenger immigrating (pigeon)** is from birds that can't fly due to the reduced size of its wings. (.....)

B. What is meant by ... ?

Extinction : ..... *(Degla Valley Sch. / Cairo 2020)*

.....

2. A. Mention the causes of the macro extinctions.

.....

.....

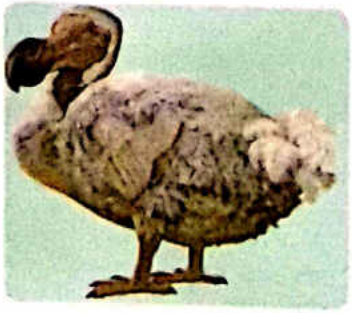
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B. Look at the pictures of these land animals, then mention the name of each one and classify it as extinct or endangered :



(1) .....

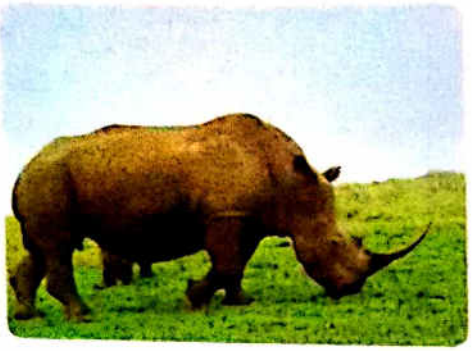
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(2) .....

.....

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(3) .....
.....



(4) .....
.....

3. A. Complete the following statements :

1. ..... is an example of endangered plants in Egypt which is used by pharaohs in manufacturing of .....
2. ..... is from endangered birds, while ..... is from endangered mammals.
3. ..... is from recently extinct birds, while ..... is from recently extinct mammals.
4. From the extinct animals in the old ages are ..... and .....

B. Read these statements, then answer the following questions :

(a) A bird its head is covered with white feathers.

(b) A non-flying bird.

Questions :

1. Name each species ?

.....

2. Determine if it is extinct or endangered ?

.....

.....

4. A. Give a reason for :

Dodo bird was an easy target to be hunted.

.....

B. Mention one difference between dodo bird and bald eagle.

Dodo bird	Bald eagle
.....	.....
.....	.....

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Worksheet 20

1. A. Mention three ways to protect living organisms from extinction.

(Lycee El-Haram Sch. / Giza 2020)

.....

.....

.....

B. Give reasons for :

1. Complicated ecosystem is not affected by the absence of one of its species.

.....

2. The desert is a simple ecosystem. *(Damietta 2020)*

.....

2. Mention one difference between complicated and simple ecosystems.

(Thebes International Sch. / Giza 2020)

Complicated ecosystem	Simple ecosystem
.....	.....
.....	.....

3. A. Complete the following table :

Protectorate	Location	Protected kind
(1)	South Sinai governorate	.....
(2) Panda protectorate	.....	.....
(3)	.....	Grey bear

B. Put (✓) or (✗) :

1. Wadi El-Raiyan is the first established protectorate in Egypt in 1983 ( )
2. Tropical forest is an example of complicated ecosystem. ( )
3. Yellowstone protectorate is found in northeastern China. ( )

4. A. What is meant by ... ?

1. Natural protectorates : .....

.....

2. Food chain : .....

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B. Choose from the following scientific terms what is suitable for the short statements :

Scientific terms	The statements
1. The protectorate of petrified forests in Qattamiya	a. is present in nature shaped as a chin.
2. Panda protectorate	b. in which, the grey bear is protected.
3. Wadi El-Hetan, part of Wadi El-Raiyan protectorate in El-Fayoum	c. is located in northeastern China.
4. Ras Mohamed protectorate	d. in which, the petrified woods are found over 35 million years.
5. El-Mokattam mountain region	e. is formed from limestone rocks.
	f. is the best world heritage area of whales' skeletons.

1. ..... 2. ..... 3. .....

4. ..... 5. .....

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General Exercise of the School Book on Unit Three

1. Choose the correct answer :

1. Fossils are often found in ..... rocks.

a. metamorphic b. sedimentary c. volcanic d. igneous

2. All of the following are endangered species except .....

a. panda. b. bald eagle. c. quagga. d. rhinoceros.

3. All of the following are natural disasters that threaten living organisms except .....

a. floods. b. volcanoes. c. drought waves. d. global warming.

2. Define each of the following :

1. Fossils : .....

.....

2. Index fossil : .....

.....

3. Natural protectorates : .....

.....

3. Correct the following statement without changing the underlined phrases :

1. The first discovered fossil of **mammoth** were found preserved in amber. (.....)

2. **Ferns fossils** indicate that they lived in mild environment. (.....)

3. **Destroying the habitat** is one of the factors that contribute to species adaptation.

(.....)

4. Mention three ways to protect living organisms from extinction :

.....

.....

.....

5. Give reasons for :

1. Petrified woods are considered from fossils although they look like rocks.

.....

.....

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2. Fossils are important in petroleum exploration.

.....

.....

3. The simple ecosystem is significantly affected by the absence of one of its species.

.....

.....

6. Which of the following represents a mold or a cast ... ?

1. Gold alloy : .....
2. Cubes of ice : .....
3. Wax Museum statues in Helwan : .....
4. Models of clothes shows : .....
5. Face of a coin on clay : .....

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Model Exams on Unit 3

Model Exam 1

56

Answer the following questions :

Question 1 14 marks

A. Choose the correct answer :

1. ..... is an example of complete body fossils.
   a. Mammoth fossil b. Ammonites fossil
   c. Nummulites fossil d. Trilobite fossil
2. The ..... replace the wood material part by part of an old tree.
   a. plastic b. iron c. minerals d. copper

(Manaret Heliopolis Sch. / Cairo 2020)

3. ..... indicate(s) the age of sedimentary rocks.
   a. Ferns fossils b. Coral fossils c. Fossil record d. Index fossils
4. All of the following are extinct species except .....
   a. dodo bird. b. quagga. c. dinosaur. d. panda bear.

B. Correct the underlined words :

1. **Mammoth** is an animal which extinct in recent times. (.....)

(Akhnaton Egyptian Sch. / Cairo 2020)

2. The complete body fossil of mammoth is found preserved in **amber**. (.....)

(Manaret Heliopolis Sch. / Cairo 2020)

3. Studying the fossil record showed that the first vertebrates that appeared were **mammals**.

(Borg El-Arab Zone. / Alex 2020) (.....)

4. Panda bear is from **extinct** species. *(Ashmoon Zone / El-Menofia 2020)* (.....)

C. Study the following food chain, then answer the questions :

Algae ⟶ Crustaceans ⟶ Small fish ⟶ Big fish ⟶ Man

1. What would happen in the absence of small fish ?

.....

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2. What is the type of this ecosystem if you know that it is strongly affected in the absence of algae ?

.....

Question 2 14 marks

A Put (✓) or (✗) :

1. The area of petrified forests in Qattamiya is called the wood mountain. ( )
2. Coral fossils indicate that the environment, where they lived was hot and rainy. ( )
3. Dinosaur and mammoth are examples of extinct species in recent times. ( )
4. Archaeopteryx is considered a link between reptiles and mammals. ( )

B Give reasons for :

1. Snow is suitable medium for formation of complete body fossil.

.....

2. Panda protectorate is an important protectorate.

.....

C Mention the causes of the recent extinction :

.....

.....

Question 3 14 marks

A Complete the following :

1. ..... plant is an ..... plant and it was used by pharaohs in manufacturing of writing papers.
2. ..... replace wood material part by part in the ..... wood fossils.
3. ..... and ..... are examples of extinct species.
4. Algae appeared before ..... and .....

B What happens if ... ?

1. An organism is buried fast after death in snow.

.....

2. Minerals replace wood material part by part of an old tree.

.....

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C What is meant by fossils ?

.....

.....

Question 4 14 marks

A Write the scientific term :

1. The coutinuous decrease without compensation in the number of a certain species until all members die out. *(Arment Directorate / Luxour 2022)* (.....)

2. They are safe areas established to protect endangered species in their homeland.

(Taymour English Sch. / Alex. 2022) (.....)

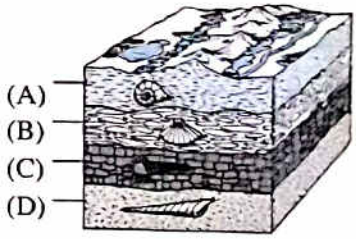
3. Fossils used in determination of the age of sedimentary rocks.

(Manaret Al Farouk Islamic Sch. / Cairo 2020) (.....)

4. It is the replica of the internal details of living organisms after death.

(Bloom Sch. / Giza 2020) (.....)

B The opposite cross-section represents several rock layers that have not been overturned, each layer contains a type of fossils.



1. Explain why the fossil found in rock layer (A) is considered to be newer than the fossil in rock layer (D).

.....

.....

2. Circle the type of rock below that most likely includes rock layers (A), (B), (C) and (D) (Give an evidence to support your choice).

Circle one : Igneous - Metamorphic - Sedimentary

The evidence : .....

C Mention three ways to protect living organisms from extinction.

.....

.....

.....

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Model Exam 2

56

Answer the following questions :

Question 1 14 marks

A Complete the following statements :

1. ..... is the most important protectorate in the USA, which was established to protect .....
2. ..... and ..... are examples of complete body fossils.
3. Simple ecosystem has ..... and it is ..... by the absence of one of its species.
4. Fossils are ..... and ..... of old living organisms that are preserved in sedimentary rocks.

B Mention one example for :

1. Simple ecosystem : ..... *(Futures Sch. / Cairo 2020)*
2. A natural protectorate : ..... *(St. Joseph Sch. / Cairo 2020)*
3. A fossil of mold ..... *(Degla Valley Sch. / Cairo 2020)*
4. An extinct animal in recent ages : .....

(Desouk Directorate / Kafr El-Sheikh 2022)

C Compare between mold and trace :

P.O.C	Mold	Trace
Definition	.....	.....
	.....	.....
	.....	.....
Example	.....	.....

Question 2 14 marks

A Choose the correct answer :

1. ..... is from extinct species.

a. Panda bear b. Rhinoceros c. Quagga d. Ibis bird

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2. ..... indicates the sequence of appearance of living organisms from simple to complicated.

a. Index fossil
b. Fossil
c. Fossil record
d. Nummulites fossil

3. Fossils that are found in the oldest layers of sedimentary rocks were formed from which types of organisms ? .....

a. Only organisms that lived in the sea.
b. Only organisms that lived on land.
c. Only organisms that lived in the air.
d. Organisms that lived on the land, in the sea and in the air.

4. Barbary sheep is from ..... *(Bloom sch. / Giza 2020)*

a. extinct animals.
b. endangered animals.
c. animals that disappeared from zone.
d. dangerous animals.

B What happens if ... ?

1. Dipping the old insects in amber.

.....

2. The absence of one type of species from the simple ecosystem.

.....

C From the following fossils :



(A)



(B)

Mention the name of each of them, then mention their importance for geologists.

.....

.....

.....

Question 3 14 marks

A Correct the underlined words :

1. **Dodo bird** is an endangered species.

.....

2. Reptiles appeared before **amphibians**.

.....

3. In petrification, **plastic** replaced the wood material.

.....

4. **Rhinoceros** is from extinct species.

.....

B Give reasons for :

1. Importance of fossils in petroleum exploration.

.....

.....

2. Establishing gene banks of endangered species.

.....

.....

C What is meant by trace ... ?

.....

.....

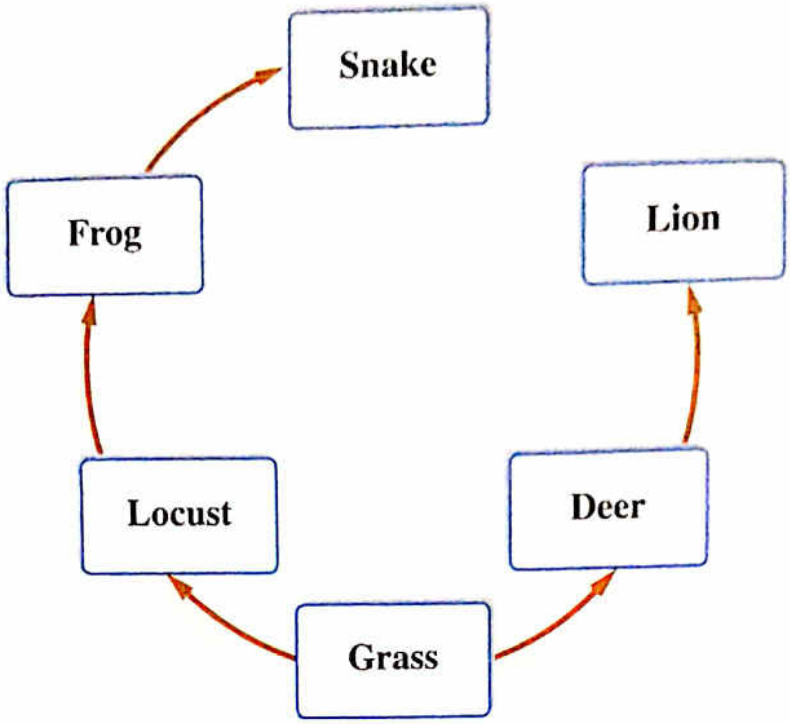
Question 4 14 marks

A Put (✓) or (✗) :

1. Bald eagle is considered from extinct animals. *(Futures Sch. / Cairo 2020)* ( )
2. Foraminifera is considered as a microfossil. *(Bloom Sch. / Giza 2020)* ( )
3. Mammoth and dinosaurs are old extinct animals. *(Dream International Sch. / Giza 2020)* ( )
4. Ferns fossils indicate that the environments where they lived was clear warm shallow seas. ( )

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B From the following diagram :



1. Identify two organisms in the food web that compete for food.

.....

2. Explain why grass might increase if the population of snakes decreased.

.....

.....

C Mention two examples of protectorates in Egypt :

1. .....

2. .....

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PART 2

Final Revision

Unit One : Periodicity of Elements and their Properties.

Unit Two : The Atmosphere and Protecting the Planet Earth.

Unit Three : Fossils and Protecting Species from Extinction.



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Final Revision on Unit 1

1 Definitions (or scientific terms) :

1. Mendeleev's periodic table :	* It is the first real periodic table for classifying elements. * It is a table in which the elements are arranged in an ascending order according to their atomic weights.
2. Moseley's periodic table :	It is a table in which the elements are arranged in an ascending order according to their atomic numbers.
3. Modern periodic table :	It is a table in which the elements are arranged in an ascending order according to the atomic numbers and the way of filling the energy sublevels with electrons.
4. Atomic number :	It is the number of positive protons inside the nucleus of the atom of an element.
5. Picometre :	* It is the measuring unit of the atomic size of the element. * It is a part from million of the million part of a metre.
6. Electronegativity :	It is the ability of the atom in a covalent molecule to attract the electrons of the chemical bond towards itself.
7. Polar compounds :	They are covalent compounds in which the difference in electronegativity between their elements is relatively high.
8. Metals :	* They are the elements which have less than four electrons in their outermost energy levels. * They are the elements which tend to lose their outermost electrons and change into positive ions during the chemical reaction.
9. Positive ion :	It is an atom of a metallic element that loses one electron or more during the chemical reaction.
10. Nonmetals :	* They are the elements which have more than four electrons in their outermost energy levels. * They are the elements which tend to gain electrons and change into negative ions during the chemical reaction.
11. Negative ion :	It is an atom of a nonmetallic element that gains one electron or more during the chemical reaction.
12. Metalloids :	They are the elements which have the properties of both metals and nonmetals, like [Boron, Silicon, Germanium, Arsenic, Antimony and Tellurium].
13. Basic oxides :	They are metallic oxides, some of them dissolve in water forming alkaline solutions.

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14. Acidic oxides :	They are nonmetallic oxides which dissolve in water forming acidic solutions.
15. Chemical activity series :	It is the arrangement of metals in a descending order according to the degree of their chemical activity.
16. Hydrogen bond :	It is a type of weak electrostatic attraction that arises between the molecules of some polar compounds.
17. Water pollution :	It is the addition of any substance to the water which causes continuous gradual change in water properties affecting the health and the life of living creatures.

2 Important laws and solved problems :

1 Determination of the location of elements of groups (A) in the modern periodic table.

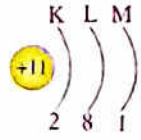
- The period number of the element = The number of energy levels occupied by electrons in its atom.
- The group number of the element = The number of electrons in the outermost energy level in its atom.

Problem

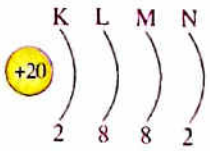
Locate the position of the following elements in the modern periodic table :

1. $_{11}Na$ **2.** $_{20}Ca$ **3.** $_{10}Ne$

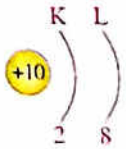
Solution

1. 

Period (3)
Group (1A)

2. 

Period (4)
Group (2A)

3. 

Period (2)
Group (0)

2 Determination of the atomic number of an element.

The atomic number of an element = The sum of the numbers of electrons rotating in energy levels "The atomic number of an element is an integer and it increases in the same period from an element to the following element by one electron".

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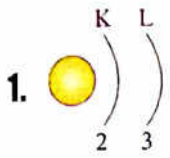
Problem

Calculate the atomic number of :

1. Element (X) which is located in period (2) and group (3A).

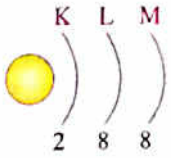
2. Element (Y) which is located in period (3) and group (0).

Solution

1. 

Atomic number of element (X)

$= 2 + 3 = 5$

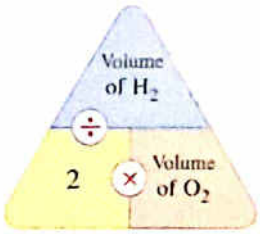
2. 

Atomic number of element (Y)

$= 2 + 8 + 8 = 18$

3 Calculation the volume of hydrogen gas or oxygen gas on electrolysis of acidified water

The volume of hydrogen gas = 2 × The volume of oxygen gas.



Problem

Calculate the volume of hydrogen gas that evolves at the negative pole if you know that the volume of oxygen gas that evolves at the positive pole of Hofmann's voltameter is 4 cm^3.

Solution

Volume of hydrogen gas = 2 × Volume of oxygen gas = 2 × 4 = 8 cm^3

3 Important or uses :

Item	Importance or use
1. Liquid sodium $_{11}Na$: (Metal)	It is used in transferring heat from inside the nuclear reactor to outside to be used to obtain the vapour energy required to generate electricity.
2. Radioactive cobalt 60 : (Transition element)	It is used in food preservation.

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3. Silicon $_{14}Si$: (Metalloid)	Silicon slides are used in the manufacture of electronics such as computer.
4. Liquefied nitrogen $_{7}N$: (Nonmetal)	It is used in preservation of cornea of the eye.
5. Hofmann's voltameter :	It is used in electrolysis of water to its elements.
6. Water :	It is very important for survival of all living organisms and it has several uses in : • Agricultural fields. • Industrial fields. • Personal fields.

4 Scientists and their contributions :

1. Mendeleev :	- He arranged elements of similar properties in **vertical columns (groups)** - He published his periodic table in his book "Principles of Chemistry" in 1871 - He classified the elements of each group into two subgroups (A and B). • ***He discovered that :*** - The elements are arranged in an ascending order according to their atomic weights on moving from the left side of the table to the right side in **horizontal rows (periods)**. - The properties of elements were **repeated periodically** by the beginning of each **new period**.
2. Rutherford :	He discovered that the nucleus of the atom contains positively charged protons.
3. Moseley :	- He named the term of **atomic number** of an element on the number of positive protons in the nucleus of its atom. - He discovered after studying X-rays properties that the periodicity of the properties of elements are related to their **atomic numbers** and not to their **atomic weights**. * **The most important modifications of Moseley on Mendeleev's table :** • He arranged elements in an ascending order according to their **atomic numbers**. • He added the zero (0) group which includes inert (noble) gases to the table. • He specified a place below the table for lanthanides and actinides elements.
4. Bohr :	He discovered the main energy levels of the atom.

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5 Important tables :

1 Important numbers :

1. No. of elements in Mendeleev's periodic table.	67
2. No. of main energy levels in the heaviest known atoms.	7
3. No. of elements in modern periodic table.	118
4. No. of available elements in Earth's crust.	92
5. No. of groups of modern periodic table.	18
6. No. of periods of modern periodic table.	7
7. No. of blocks of modern periodic table.	4
8. The angle between two single covalent bonds in water molecule.	104.5°
9. Boiling point of water.	100°C
10. Freezing point of water.	0°C
11. Boiling point of liquid nitrogen.	– 196°C

2 Advantages and disadvantages of Mendeleev's periodic table :

Advantages of Mendeleev's table :	1. He left gaps (empty cells) in his table predicting the discovery of new elements. 2. He corrected the atomic weights of some elements which were estimated wrongly.
Disadvantages of Mendeleev's table :	1. He had to make disorder in the arrangement in the ascending order of atomic weights of some elements to put them in groups that suit their properties. 2. He had to consider the isotopes of one element are different elements due to the difference in their atomic weights so, he had to put more than one element in one place (cell) of his table.

3 The reaction of metals with water depends on the position of the metal in chemical activity series :

Metals		Reaction with water
Potassium	**K**	They react instantly with water and hydrogen gas evolves which burns with a pop sound.
Sodium	**Na**	
Calcium	**Ca**	They react very slowly with cold water.
Magnesium	**Mg**	
Zinc	**Zn**	They react with hot water vapour at high temperature only.
Iron	**Fe**	
Copper	**Cu**	They don't react with water.
Silver	**Ag**	

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4 The physical state of halogens :

Halogen :	Fluorine	Chlorine	Bromine	Iodine
Physical state :	Gas		Liquid	Solid

6 Important equations :

1. Mg (Magnesium) + $2HCl$ (Hydrochloric acid) $\xrightarrow{Dil.}$ $MgCl_2$ (Magnesium chloride) + $H_2\uparrow$ (Hydrogen gas)
2. $2Mg$ (Magnesium) + O_2 (Oxygen) $\xrightarrow{\Delta}$ $2MgO$ (Magnesium oxide)
3. MgO (Magnesium oxide) + H_2O (Water) $\longrightarrow$ $Mg(OH)_2$ (Magnesium hydroxide)
4. C (Carbon) + HCl (Hydrochloric acid) $\xrightarrow{Dil.}$ No reaction
5. C (Carbon) + O_2 (Oxygen) $\xrightarrow{\Delta}$ CO_2 (Carbon dioxide)
6. CO_2 (Carbon dioxide) + H_2O (Water) $\longrightarrow$ H_2CO_3 (Carbonic acid)
7. $2Na$ (Sodium) + $2H_2O$ (Water) $\longrightarrow$ $2NaOH$ (Sodium hydroxide) + $H_2\uparrow$ (Hydrogen gas)
8. $2K$ (Potassium) + $2H_2O$ (Water) $\longrightarrow$ $2KOH$ (Potassium hydroxide) + $H_2\uparrow$ (Hydrogen gas)
9. $2K$ (Potassium) + Br_2 (Bromine) $\longrightarrow$ $2KBr$ (Potassium bromide)
10. $2Na$ (Sodium) + Cl_2 (Chlorine) $\longrightarrow$ $2NaCl$ (Sodium chloride)
11. Cl_2 (Chlorine) + $2KBr$ (Potassium bromide) $\longrightarrow$ $2KCl$ (Potassium chloride) + Br_2 (Bromine)
12. Cl_2 (Chlorine) + $2NaBr$ (Sodium bromide) $\longrightarrow$ $2NaCl$ (Sodium chloride) + Br_2 (Bromine)

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(i) Br_2 + $2KI \longrightarrow 2KBr$ + I_2

Bromine — Potassium iodide — Potassium bromide — Iodine

(ii) $2H_2O \xrightarrow{\text{Electrolysis}} 2H_2\uparrow + O_2\uparrow$

Water — Hydrogen — Oxygen

7 Give reasons for :

1. **Many attempts are made by scientists for classification of elements.**
   To facilitate their study and find a relationship between elements and their chemical and physical properties.
2. **Mendeleev left gaps (empty cells) in his periodic table.**
   Because he predicted the discovery of new elements and determined the values of their atomic weights.
3. **Mendeleev had to make disorder in the ascending order of atomic weights of some elements.**
   To put these elements in groups that suit their properties.
4. **Mendeleev had to consider the isotopes of one element are different elements.**
   Due to the difference in their atomic weights.
5. **Mendeleev had to put more than one element in one cell.**
   Due to the similarity in their properties.
6. **Mendeleev classified the elements of each main group into two subgroups (A & B).**
   Due to the differences between the properties of their elements.
7. **Moseley arranged elements in an ascending order according to their atomic numbers.**
   Because he discovered after studying X-rays properties that the periodic properties of elements are related to their atomic numbers and not their atomic weights.
8. **Helium ($_2$He) is located in zero group and isn't located in group (2A).**
   Because it has only one energy level (K) which is saturated with 2 electrons, so it is a noble gas located in zero group (group 18).
9. • **Elements of the same group have similar properties.**
   • **Properties of elements ($_{12}$Mg) and ($_{20}$Ca) are similar.**
   Because their atoms have the same number of electrons (two electrons) in the outermost energy level.
10. **Both sodium ($_{11}$Na) and potassium ($_{19}$K) are located in the same group.**
    Because their atoms have the same number of electrons (one electron) in the outermost energy level.

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11. Both lithium ($_3$Li) and nitrogen ($_7$N) are located in the same period.

Because their atoms have the same number of energy levels (2 levels) occupied by electrons.

12. Scientists cannot discover a new element between sulphur ($_{16}$S) and chlorine ($_{17}$Cl).

Because the atomic number of each element is an integer and it increases than its preceding one in the same period by one.

13. • In the same period, the atomic size decreases by increasing the atomic number.

Because the attraction force between the positive nucleus and the outermost electrons increases through the period by increasing the atomic number (by going from left to right).

14. • By increasing the atomic number within the same group, the atomic size increases from top to bottom.

Due to the increase of the number of energy levels through the group by increasing the atomic number (on going from up to down).

15. Water and ammonia are polar covalent compounds.

Because the difference in electronegativity between the elements forming their molecules is relatively high.

16. Water is more polar than ammonia.

Because the difference in electronegativity between oxygen and hydrogen in water molecule is greater than that between nitrogen and hydrogen in ammonia molecule.

17. Sodium ($_{11}$Na) atom tends to form a positive ion, while chlorine ($_{17}$Cl) atom tends to form a negative ion.

Because sodium atom loses the outermost electron forming positive ion, while chlorine atom gains an electron forming negative ion.

18. Both sodium ion (Na^+) and fluoride ion (F^-) have the same number of electrons.

Because during chemical reactions, sodium atom ($_{11}$Na) loses one electron and fluorine atom ($_9$F) gains one electron so, the number of electrons becomes 10 electrons in both ions.

19. The metallic property for elements of group (1A) increases by increasing the atomic number.

Due to increasing their atomic sizes, so they can lose their valency electron easily.

20. • Cesium (Cs) is the most metallic element.

• Cesium (Cs) is the most active metal in the periodic table.

Because it has the largest atomic size, so it can lose its valency electron easily.

21. We can use dilute HCl to differentiate between carbon and magnesium.

Because magnesium is a metal which reacts with dilute HCl and hydrogen gas evolves, while carbon is a nonmetal which doesn't react with HCl.

$$Mg + 2HCl \xrightarrow{Dil.} MgCl_2 + H_2\uparrow$$

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22. Solution of magnesium oxide turns the violet litmus solution into blue.

Because magnesium oxide dissolves in water forming magnesium hydroxide (alkaline solution) which turns litmus solution into blue.

$MgO + H_2O \longrightarrow Mg(OH)_2$

23. We can use water to differentiate between calcium and zinc.

Because calcium can react with cold water, while zinc reacts with hot water vapour at high temperature only.

24. Nonmetal oxides are known as acidic oxides.

Because they dissolve in water forming acidic solutions.

25. Solution of carbon dioxide turns the violet litmus solution into red.

Because it dissolves in water forming carbonic acid which turns litmus solution into red.

$CO_2 + H_2O \longrightarrow H_2CO_3$

26. Aluminium oxide is considered as an amphoteric oxide.

Because it reacts with acids as a basic oxide and it reacts with bases as an acidic oxide giving salt and water in the two cases.

27. Elements of group (1A) are known as alkali metals.

Because they react with water forming alkaline solutions.

$2Na + 2H_2O \longrightarrow 2NaOH + H_2\uparrow$

28. Lithium floats on water surface, while cesium sinks in water.

Because the density of lithium is less than that of water, while the density of cesium is greater than that of water.

29. Alkali metals are monovalent elements.

Because they tend to lose the valency electron during the chemical reaction.

30. Sodium is kept under the surface of kerosene.

To prevent it from the reaction with moist air as it is an active metal.

31. Lithium ($_3$Li) is the least active metal in group (1A).

Because it has the least atomic size in group (1A).

32. Sodium fires are not put off with water.

Because sodium reacts instantly with water and hydrogen gas evolves which burns with a pop sound.

$2Na + 2H_2O \longrightarrow 2NaOH + H_2\uparrow$

33. Potassium is more active than sodium.

Because the atomic size of potassium is larger than that of sodium.

34. The reaction of potassium with water is more strongly than that of sodium.

Because potassium is more active than sodium.

35. Elements of group (7A) are known as halogens.

Because they react with metals forming salts.

$2K + Br_2 \longrightarrow 2KBr$

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36. Halogens are monovalent.

Because they tend to gain one electron only during the chemical reaction.

37. • Halogens exist in the form of diatomic molecules.

• Halogens do not exist in nature in elementary state.

Because they are chemically active elements.

38. Bromine can't replace chlorine in its salt solution.

Because bromine is less active than chlorine.

39. Liquid sodium is used in nuclear reactors.

Because it is a good conductor of heat, where it transfers the heat from inside the nuclear reactor to outside it to be used to obtain vapour energy required to generate electricity.

40. The use of radioactive cobalt 60 in food preservation.

Because it emits gamma rays which prevent the reproduction of microbial cells without an effect on human.

41. Silicon is used in the manufacture of electronics.

Because it is a semi-conductor, its ability to conduct electricity depends on the temperature.

42. The importance of liquefied nitrogen in the medical fields.

Because it is used in the preservation of cornea of the eye.

43. Liquefied nitrogen is used in preservation of cornea of the eye.

Due to the decrease of its boiling point (– 196°C).

44. Water has several uses.

Because it is used in agricultural fields, industrial fields and personal fields.

45. The high boiling point of water.

Due to the presence of hydrogen bonds between water molecules.

46. The presence of hydrogen bonds between water molecules.

Due to the higher electronegativity of oxygen compared with hydrogen.

47. • Water has the ability to dissolve most ionic compounds.

• Dissolving of table salt in water.

Because water is a good polar solvent.

48. Dissolving of sugar in water although it is from covalent compounds.

Because sugar molecules can make hydrogen bonds with water molecules.

49. Oil doesn't dissolve in water.

Because it is a covalent compound which can't make hydrogen bonds with water, so it doesn't dissolve in it.

50. Ice floats on the water surface.

Because the density of ice is less than the density of water.

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51. **Although water of oceans freezes at polar zones, the aquatic creatures are still alive.**
Due to formation of a layer of ice on the surface of liquid water protects the deep water from freezing which preserves the life of marine organisms in it.

52. **The density of water in solid state (ice) is less than that its density in liquid state.**
Because when the temperature of water becomes less than 4°C, water molecules are collected together by hydrogen bonds forming large-sized hexagonal ice crystals with many spaces between them, so its volume increases and thus its density decreases.

53. **The volume of 5 gm of ice is more than the volume of 5 gm of water at 4°C.**
Because the density of ice is less than that of water at 4°C.

54. **Pure water doesn't affect litmus paper dye.**
Because pure water has a neutral effect on litmus paper dye.

55. **On putting a glass bottle completely filled with water in a freezer, it will break.**
Because when water freezes, its volume increases.

56. **Adding few drops of dilute sulphuric acid to water during its electrolysis by Hofmann's voltameter.**
To make water conduct to electricity, where pure water is a bad conductor of electricity.

57. **The glowing of splint increases by approaching it to the anode of Hofmann's voltameter during electrolysis of acidified water.**
Because oxygen gas evolves at the anode which increases the glowing of splint.

58. **Biological water pollution affect the human health.**
Because biological water pollution causes the infection with many diseases such as : bilharzia, typhoid and hepatitis.

59. **Chemical water pollution is more dangerous than biological pollution.**
Because chemical water pollution causes dangerous diseases such as the death of brain cells, blindness and liver cancer.

60. **It is dangerous to eat fish containing high concentration of lead.**
Because this leads to death of brain cells.

61. **Thermal pollution of water leads to death of marine creatures.**
Because this leads to the separation of the dissolved oxygen in water.

62. **We should not keep the tap water in plastic bottles of mineral water.**
Because plastic reacts with chlorine gas which is used as water disinfectant leading to the increase in the infection rates by cancer.

8 What happens when ... ?

1. **Increasing the atomic number in group (1A) [concerning the atomic size].**
The atomic size increases.

2. **A metallic atom loses one electron or more during the chemical reaction.**
It changes into a positive ion.

3. **A nonmetallic atom gains one electron or more during the chemical reaction.**
It changes into a negative ion.

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4. We go from up to down inside the group (1A).
The atomic number increases, the atomic size increases and the metallic property increases.

5. Adding dil. HCl to a piece of magnesium.
Magnesium chloride is formed and hydrogen gas evolves as bubbles.

$$Mg + 2HCl \xrightarrow{Dil.} MgCl_2 + H_2\uparrow$$

6. Burning a magnesium strip inside a test tube contains oxygen.
It burns with a bright light and magnesium oxide powder is formed.

$$2Mg + O_2 \xrightarrow{\Delta} 2MgO$$

7. Adding some water to magnesium oxide with shaking.
It dissolves in water forming magnesium hydroxide.

$$MgO + H_2O \longrightarrow Mg(OH)_2$$

8. Adding the violet litmus solution to magnesium hydroxide.
The solution turns into blue.

9. Adding the violet litmus solution to a jar containing a piece of burning coal.
The solution turns into red.

10. Passing carbon dioxide gas in water.
It dissolves forming carbonic acid solution.

$$CO_2 + H_2O \longrightarrow H_2CO_3$$

11. Adding dil. HCl to a test tube containing a piece of carbon.
No reaction takes place.

12. Adding the violet litmus solution to potassium hydroxide solution.
The solution turns into blue.

13. Putting a piece of sodium in water.
It reacts strongly with water forming sodium hydroxide and hydrogen gas evolves which burns with a pop sound.

$$2Na + 2H_2O \longrightarrow 2NaOH + H_2\uparrow$$

14. Passing chlorine gas in potassium bromide solution.
Chlorine replaces bromine in its solution.

$$Cl_2 + 2KBr \longrightarrow 2KCl + Br_2$$

15. Putting a piece of potassium in a beaker containing liquid bromine.
Potassium bromide salt is formed.

$$2K + Br_2 \longrightarrow 2KBr$$

16. Putting a glass bottle filled with water in the freezer for a long time.
It will be broken.

17. Decrease in water temperature less than 4°C
The water molecules are collected together by hydrogen bonds forming large-sized hexagonal ice crystals with many spaces between them so, its volume increases and thus its density decreases.

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18. **Water molecules are linked together by hydrogen bonds.**
The abnormality of water properties such as rising of its boiling and freezing points and decreasing its density on freezing.

19. **Passing of electric current through Hofmann's voltameter containing acidified water.**
The acidified water decomposes into hydrogen gas evolves at the cathode and oxygen gas evolves at the anode. The ratio between the produced hydrogen gas and oxygen gas is about (2 : 1) by volume respectively.

20. **Water is polluted by animal and human wastes.**
It causes biological water pollution which causes the infection by many diseases such as bilharzia, typhoid and hepatitis.

21. **Storing water in plastic bottles of mineral water.**
Plastic reacts with chlorine gas (which is used as water disinfectant) leading to the increase in the infection rates by cancer.

22. • **Throwing synthetic cleaning substances in water.**
• **Dumping the atomic wastes in oceans and seas.**
This leads to increase the concentration of some elements causing great harms.

23. **Increasing the ratio of arsenic in drinking water.**
It increases the infection rate by liver cancer.

24. **Increasing the concentration of mercury in drinking water.**
It causes blindness.

25. **Eating fish contains high concentration of lead.**
It causes the death of brain cells.

9 Comparisons :

1 Mendeleev's periodic table, Moseley's periodic table and Modern periodic table.

Mendeleev's periodic table	Moseley's periodic table	Modern periodic table
Elements are classified in an ascending order according to their atomic weights.	Elements are classified in an ascending order according to their atomic numbers.	Elements are classified in an ascending order according to : • Their atomic numbers. • The way of filling their energy sublevels with electrons.

2 Main energy levels and energy sublevels.

Points of comparison	Main energy levels	Energy sublevels
• Their number in the heaviest known atoms till now :	7	4
• They are symbolized by :	K , L, M, N, O, P and Q	s, p, d and f

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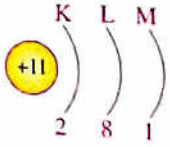
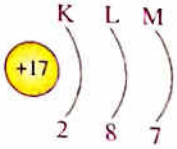
3 s-block and p-block.

Points of comparison	s-block	p-block
• Its location in the periodic table :	On the left side.	On the right side.
• It includes :	Two groups (1A) and (2A)	Six groups (3A), (4A) , (5A) , (6A) , (7A) and (0)

4 d-block and f-block.

Points of comparison	d-block	f-block
• Its location in the periodic table :	In the middle	Below the periodic table.
• It includes :	Transition elements	Lanthanides and actinides.

5 Sodium ($_{11}$Na) element and chlorine ($_{17}$Cl) element.

Points of comparison	$_{11}$Na	$_{17}$Cl
• Electronic configuration of the atom :		
• Group no. :	(1A)	(7A)
• Period no. :	3	3
• Block :	s	p

6 Period elements and group elements.

Period elements	Group elements
- They are different in properties.	- They are similar in properties.
- They are similar in the number of energy levels occupied by electrons.	- They are similar in the number of electrons of the outermost energy level.
- They are different in the number of electrons of the outermost energy level.	- They are different in the number of energy levels occupied by electrons.
- By increasing their atomic numbers : • The atomic size decreases. • The metallic property decreases till we reach metalloid, then the nonmetallic property increases and ends with an inert gas.	**- By increasing their atomic numbers :** • The atomic size increases. • The metalic property increases "in groups which start with a metallic element".

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7 Positive ion and negative ion.

Positive ion	Negative ion
- It is an atom of a metallic element that loses one electron or more during the chemical reaction.	- It is an atom of a nonmetallic element that gains one electron or more during the chemical reaction.
- The number of its electrons is less than that of its protons.	- The number of its electrons is more than that of its protons.
- It carries a number of positive charges equals to the number of lost electrons.	- It carries a number of negative charges equals to the number of gained electrons.
- The number of its energy levels is less than the number of energy levels in its atom.	- The number of its energy levels is equal to the number of energy levels in its atom.
- Its electronic structure is similar to that of the nearest inert gas preceding its atom in the periodic table.	- Its electronic structure is similar to that of the nearest inert gas following its atom in the periodic table.

8 Metals and nonmetals.

Metals	Nonmetals
- They are the elements which have less than four electrons in their outermost energy levels.	- They are the elements which have more than four electrons in their outermost energy levels.
- They tend to lose electrons and change into positive ions.	- They tend to gain electrons and change into negative ions.
- They are characterized by largest atomic sizes.	- They are characterized by smallest atomic sizes.
- Some of them react with dilute acids forming salt of acid and hydrogen gas.	- They don't react with dilute acids.
- They react with oxygen forming basic oxides.	- They react with oxygen forming acidic oxides.

9 Basic oxides and acidic oxides.

Basic oxides	Acidic oxides
- They are metal oxides.	- They are nonmetal oxides.
- They are formed by the reaction of metal with oxygen.	- They are formed by the reaction of nonmetal with oxygen.
- Some of them dissolve in water forming alkaline solutions.	- They dissolve in water forming acidic solutions.
- Their solutions turn litmus solution into blue. – ***Ex.*** **: MgO and Na_2O**	- Their solutions turn litmus solution into red. – ***Ex.*** **: CO_2 & SO_2**

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10 Fluorine ($_9F$) and cesium ($_{55}Cs$).

Points of comparison	Fluorine ($_9F$)	Cesium ($_{55}Cs$)
• The kind of the element :	Halogen.	Alkali metal.
• Its position in the periodic table :	Period (2) and group (7A).	Period (6) and group (1A).
• Atomic size :	The smallest atomic size element in the periodic table.	The largest atomic size element in the periodic table.

11 Alkali group and halogens group.

Points of comparison	Alkali group	Halogens group
• Group no.	(1) 1A	(17) 7A
• Position :	On the maximum left side of the periodic table.	On the right side of the periodic table.
• Block belongs to it :	s-block.	p-block.
• Kind of their elements :	Metals.	Nonmetals.
• Connecting their elements to electricity and heat :	Good conductors of heat and electricity.	Bad conductors of heat and electricity.

12 Fluorine and helium.

Fluorine	Helium
- It belongs to halogens [group (17) 7A]	- It belongs to inert gases [group (18) 0]
- The outermost energy level of its atom contains 7 electrons.	- The outermost energy level of its atom contains 2 electrons.
- It is located in period (2).	- It is located in period (1).
- A halogen.	- An inert gas.
- Its molecule consists of two atoms.	- Its molecule consists of one atom.

13 Natural and artificial environmental pollutants.

Natural pollutants	Artificial pollutants
They arise from natural phenomenon such as : - Volcanic eruptions. - Death of living creatures. - Lightning accompanied by thunder storms.	They arise from different human activities such as : - Burning coal and oil which leads to the formation of acidic rains and smog. - The overuse of chemical insecticides and fertilizers. - Throwing sewage, factories wastes and leakage of petroleum oil in the seas and rivers.

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Kinds of water pollution.

Points of comparison	Chemical pollution	Biological pollution	Radiant pollution	Thermal pollution
1. It originates from :	Discharging factories residues and sewage in seas and rivers.	Mixing animals and human wastes with water.	Dumping the atomic wastes in oceans and seas.	Increasing the temperature of some marine zones which use water for cooling the nuclear reactors.
2. Its harms :	* Blindness. * Liver cancer. * Death of brain cells.	* Bilharzia. * Typhoid. * Hepatitis.	----------	* Death of marine creatures.

10 Activities :

Activity 1 Magnesium oxide is a basic oxide.

Steps :

1. Ignite one end of a magnesium strip until it burns, then put it in a jar filled with oxygen gas.
2. Add some drops of water with some drops of violet litmus solution to the produced substance.

Observations :

- Magnesium strip burns with a bright light and magnesium oxide is formed.
- Magnesium oxide dissolves in water.
- Litmus solution turns into blue.

Conclusion :

Magnesium oxide dissolves in water forming alkaline solution which turns litmus solution into blue.

$$MgO + H_2O \longrightarrow Mg(OH)_2$$

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Activity 2 Reaction of magnesium with dilute acid.

Step :

Put a part of magnesium strip in a test tube and add some dilute hydrochloric acid (HCl).

Observation :

Evolving of gas bubbles.

Conclusion :

Magnesium reacts with dilute acid [HCl] giving magnesium chloride and hydrogen gas evolves.

$$Mg + 2HCl \xrightarrow{dil.} MgCl_2 + H_2\uparrow$$

Activity 3 Carbon dioxide is an acidic oxide.

Steps :

1. Burn a piece of coal in a burning spoon and put it after complete burning in a cylinder full of oxygen.
2. Add some water and drops of violet litmus solution to the cylinder.

Observations :

- The glowing increases.
- Carbon dioxide dissolves in water.
- The solution turns into red.

Conclusion :

Carbon dioxide dissolves in water forming acidic solution which turns litmus solution into red.

$$CO_2 + H_2O \longrightarrow H_2CO_3$$

Activity 4 Reaction of nonmetals [such as carbon with dilute acids.

Steps :

1. Put a piece of coal (carbon) in a test tube.
2. Add some dilute HCl to the tube.

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Observation :

No reaction takes place

Conclusion :

Nonmetals [such as carbon] don't react with dilute acids.

Activity 5 Potassium is more active than sodium.

Steps :

1. Put a small piece of sodium in a beaker containing some water ***Fig. (a).***
2. Repeat the step number (1) using potassium instead of sodium ***Fig. (b)***.



Fig. (a)



Fig. (b)

Observations :

- Both sodium and potassium react strongly with water and hydrogen gas evolves which burns with a pop sound.
- The reaction of potassium with water is more strongly than that of sodium.

Conclusion :

Potassium is more active than sodium.

Activity 6 To prove that water is a good polar solvent.

Steps :

1. Put an equal amounts of water in three glass beakers.
2. Put a spoon of sugar in the first beaker and a spoon of table salt in the second and some drops of oil in the third with stirring.

Observation :

Both sugar and table salt dissolve in water, while oil doesn't dissolve.

Conclusion :

* **Water is a good polar solvent for :**
  - most ionic compounds such as table salt (sodium chloride).
  - some covalent compounds such as sugar that can form hydrogen bonds with water.
* **Most covalent compounds such as oil can't dissolve in water as they can't form hydrogen bonds with water.**

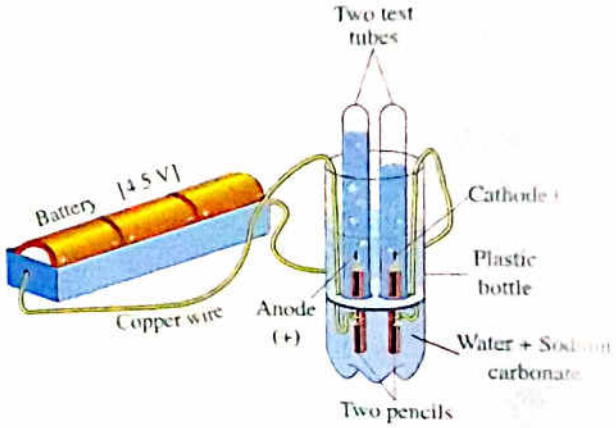
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Activity 7 Electrolysis of water.

Steps :

Connect the circuit as shown in the figure, then close it for 10 min. :

1. Approach a glowing splint to the gas evolved at both cathode and anode.
2. Compare between the volume of the evolved gas above the negative pole (cathode) and the volume of the evolved gas above the positive pole (anode).



Observations :

1. The evolved gas above the cathode burns with a pop sound, while the evolved gas above the anode makes the glowing splint more glowing.
2. The volume of the evolved gas above the cathode is twice the volume of the evolved gas above the anode.

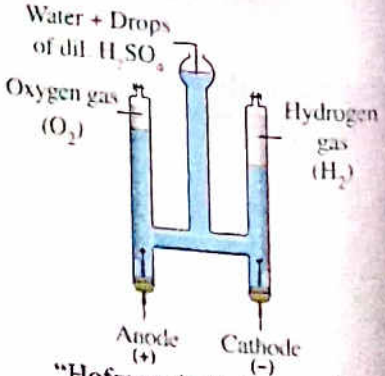
Conclusion :

The acidified water decomposes by electricity into :

- **Hydrogen gas** evolves at the **cathode**.
- **Oxygen gas** evolves at the **anode**.

- The ratio between the produced hydrogen gas and oxygen gas is about (2 : 1) by volume respectively.

$$2H_2O \xrightarrow{\text{Electrolysis}} 2H_2\uparrow + O_2\uparrow$$



"Hofmann's Voltameter"

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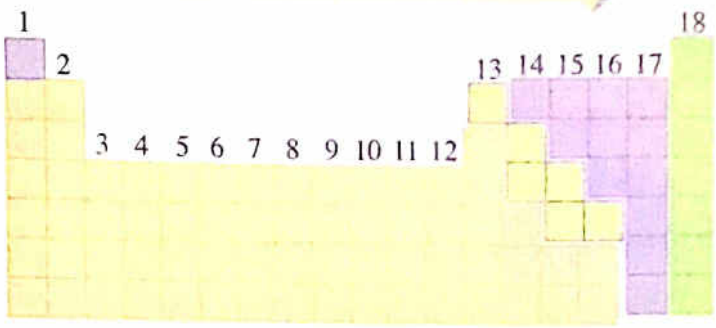
11 Main points :

* The atomic size is determined by knowing the atomic radius and measured in picometre.
* **Graduation of properties of elements in the modern periodic table :**

By increasing the atomic number

in period
* The atomic size decreases.
* The metallic property decreases.
* The nonmetallic property increases.

in group
* The atomic size increases.
* The metallic property increases.
* The nonmetallic property decreases.

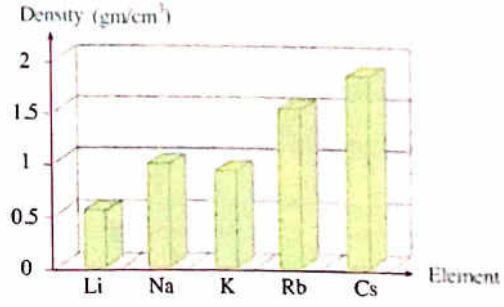


– **Cs** is the strongest metallic element in group (1A).

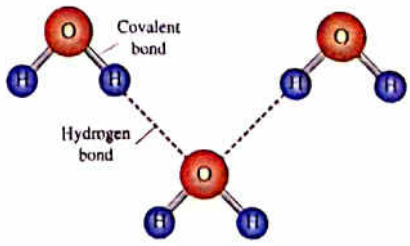
– **Li** is the least metallic element in group (1A).

– The most nonmetallic element is found in group (7A).

* **The density of alkali metals :**
  • Most of them have low density.
  - (Li), (Na) and (K) float on the water surface.
  - (Rb) and (Cs) sink in water.



* ***Structure of water :***
  - Water molecule is formed by combination of one oxygen atom (O) with two hydrogen atoms (H) by two ***single covalent bonds***, the angle between them is 104.5°
  - Due to the higher electronegativity of oxygen compared with hydrogen, polar water molecules are linked together by "***hydrogen bonds***".



* *Properties of water :*

1 Physical properties :

- Water exists in three states which are solid state (ice), liquid state (water) and gaseous state (water vapour).
- Water is a good polar solvent for most ionic compounds and some covalent compounds such as sugar.
- Pure water boils at 100°C and freezes at 0°C.
- Water density decreases on freezing.

2 Chemical properties :

- Water has a neutral effect on both of litmus papers.
- Electrolysis of water.

* *Protection of water from pollution :*

- Preventing of getting rid of sewage, wastes of factories and dead animals in rivers or canals.
- Developing the stations of water purification and doing a periodical analysis to determine the rate of water validity used in drinking.
- Disinfection of the drinking water tanks which are found on the roofs of buildings in a periodical manner.
- Don't store the tap water in empty plastic bottles, because plastic reacts with chlorine gas (which is used as water disinfectant) leading to the increase in the infection rates of cancer.
- Spreading environmental awareness among people to protect water from pollution.

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Final Revision on Unit 2

1 Definitions (or scientific terms) :

1. Atmospheric envelope of the Earth :	It is a gaseous envelope surrounding the Earth, that rotates with the Earth around its axis and extends for about 1000 km above sea level.
2. Atmospheric pressure :	It is the weight of air column of an atmospheric height on a unit area ($1 m^2$)
3. Normal atmospheric pressure :	It is the atmospheric pressure at sea level.
4. Isobar :	Curved lines that join the points of equal pressure in atmospheric pressure maps.
5. Tropopause :	It is the region between troposphere and stratosphere layers.
6. Stratopause :	It is the region between stratosphere and mesosphere layers.
7. Mesopause :	It is the region between mesosphere and thermosphere layers.
8. Ionosphere layer :	It is a layer that contains charged ions and it exists in the upper part of thermosphere, and extends up to 700 km above sea level.
9. Van-Allen Belts :	They are two magnetic belts surrounding ionosphere.
10. Aurora phenomenon :	It is a phenomenon that appears as brightly coloured light curtains seen at both the north and south poles of the Earth.
11. Exosphere :	It is a region in which the atmospheric envelope is inserted in outer space.
12. Ozone hole :	It means thinning or losing parts of ozone layer above the south pole of the Earth.
13. Ozone molecule :	It is a gas, whose molecule consists of three oxygen atoms.
14. Dobson :	It is the measuring unit of the degree of ozone.
15. Near ultraviolet rays :	It is a type of ultraviolet rays that penetrate ozone layer by a percentage 100%.
16. Medium ultraviolet rays :	It is a type of ultraviolet rays that don't penetrate the ozone layer by a percentage 95%.
17. Far ultraviolet rays :	It is a type of ultraviolet rays that don't penetrate the ozone layer by a percentage 100%.
18. Global Warming phenomenon :	It is the continuous increase in the average temperature of the Earth's near-surface air.
19. Greenhouse effect :	It is the trapping of infrared radiation in the troposphere layer due to the increase in the percentage of greenhouse gases which cause the increase in the planet Earth's temperature.

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2 Important shortcuts :

1. UV	Ultraviolet rays.
2. STP	Standard temperature and pressure.
3. CFC_s	Chlorofluorocarbon compounds.
4. IPCC	The Intergovernmental Panel on Climate Changes.

3 Important laws and solved problems :

1 The temperature changes which occur in troposphere layer.

- The temperature decreases with a rate (6.5°C) for each (1 km) height above sea level.
- The amount of change (decrease or increase) in temperature = height (km) × 6.5
- The temperature at the top of a mountain
  = the temperature at its base – the decrease in temperature.
- The temperature at the base of a mountain
  = the temperature at its top + the increase in temperature.
- The amount of change in temperature
  = temperature of the foot of the mountain – temperature of the top of the mountain.

Problems

1 *Calculate the temperature at the base of a mountain, if its height is 6000 m and the temperature at its top is 10°C.*

Solution

- Height $= \frac{6000}{1000} = 6$ km.
- The amount of increase in temperature = height × 6.5°C
  $= 6 \times 6.5 = 39°C$
- The temperature at the base of a mountain
  = the temperature at its top + the increase in temperature
  $= 10 + 39 = 49°C$

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2 Calculate the height of a mountain if the temperature at its base is 30°C and at its top is (– 6°C).

Solution

- The amount of change in temperature = the temp. at the base of mountain – the temp. at the top of mountain = 30 – (– 6) = 36°C

- The height of the mountain = $\frac{\text{amount of change in temp.}}{6.5°C}$

$= \frac{36}{6.5} = 5.5$ km.

2 The percentage of erosion of ozone layer in a certain area.

∵ The degree of erosion of ozone layer in a certain area = the normal degree of ozone layer – the degree of ozone in this area.

∴ The percentage of erosion of ozone layer in a certain area

$= \frac{\text{The degree of eroston of ozone layer}}{\text{The normal degree of ozone layer}} \times 100$

Problem

Calculate the percentage of erosion of ozone layer in an area if you know that the degree of its ozone is 150 dobson.

Solution

The degree of erosion of ozone layer in an area = 300 – 150 = 150 dobson.

The percentage of erosion of ozone layer in this area = $\frac{150}{300} \times 100 = 50\%$

4 Important numbers and percentages :

1. The height of atmospheric envelope :	**1000 km**
2. The normal atmospheric pressure :	**1013.25 mbar**
3. The percentage of the mass of atmospheric air that is present in the area between sea level and 3 km height :	**50%**
4. The percentage of the mass of atmospheric air that is present up to 16 km height above sea level :	**90%**
5. The thickness of troposphere layer :	**13 km**

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6. The percentage of the mass of atmospheric air in troposphere :	**75%**
7. The percentage of atmospheric water vapour in troposphere :	**99%**
8. The atmospheric pressure at the end of troposphere (tropopause) :	**100 mbar**
9. The temperature at the end of troposphere (tropopause) :	**– 60°C**
10. The thickness of stratosphere layer :	**37 km**
11. The atmospheric pressure at the end of stratosphere (stratopause) :	**1 mbar**
12. The temperature at the end of stratosphere (stratopause) :	**0°C**
13. The thickness of mesosphere :	**35 km**
14. The atmospheric pressure at the end of mesosphere (mesopause) :	**0.01 mbar**
15. The temperature at the end of mesosphere (mesopause) :	**– 90°C**
16. The thickness of thermosphere :	**590 km**
17. The temperature at the end of thermosphere :	**1200°C**
18. The atmospheric pressure of thermosphere :	**0.001 mbar**
19. The thickness of ozone layer :	**20 km**
20. The height in which the presence of charged ions ends in ionosphere :	**700 km**
21. Number of oxygen atoms in ozone molecule :	**3**
22. The thickness of ozone layer at (STP) conditions :	**3 mm**
23. Normal degree of ozone :	**300 Dobson**
24. The wavelength of near ultraviolet rays :	**315 – 400 nm**
25. The wavelength of medium ultraviolet rays :	**280 – 315 nm**
26. The wavelength of far ultraviolet rays :	**100 – 280 nm**
27. The percentage of near UV radiations that penetrate ozone layer :	**100%**
28. The percentage of medium UV radiations that don't penetrate ozone layer (Or the percentage of medium UV radiations that are absorbed by ozone layer) :	**95%**
29. The percentage of far UV radiations that don't penetrate ozone layer (Or the percentage of far UV radiations that are absorbed by ozone layer) :	**100%**
30. Nanometre :	**1×10^{-9} metre**

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5 Importance or uses :

Item	Importance or uses
1. Barometer :	It is used to measure the atmospheric pressure.
2. Altimeter :	It is used by pilots in aeroplanes to measure the elevation from sea level based on atmospheric pressure.
3. Aneroid :	It is used to determine the possible day weather based on atmospheric pressure.
4. Isobar :	To join the points of equal pressure in atmospheric pressure maps.
5. Atmospheric pressure maps :	They are used to detect the directions of winds, as winds move from the areas of high atmospheric pressure to the areas of low atmospheric pressure.
6. Troposphere :	- In which, all weather phenomena take place. - It organizes the Earth's temperature.
7. Ozone layer :	It acts as a protective shield for living organisms against the harmful chemical effects of ultraviolet radiations.
8. Mesosphere :	It protects the planet Earth from celestial rocky masses that enter the atmospheric envelope, where some of them burn completely forming meteors.
9. Ionosphere :	It is important in wireless communications and broadcasting.
10. Van-Allen Belts :	They play an important role in scattering harmful charged cosmic radiations away from the Earth.
11. Exosphere :	In which, satellites orbit around the Earth.
12. Satellites :	They transmit weather condition information and TV programs.
13. Chlorofluorocarbon compounds (CFC_s) [Freons] :	They are used as : • A cooling substance in air conditioning sets. • A propellant substance in aerosols. • A flating substance in making foam backing. • A solvent substance for cleaning electric circuits slides.
14. Methyl bromide gas :	It is used as an insecticide to preserve stored agricultural crops.
15. Halons :	They are used in extinguishing fires.

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6 What is the role of ... ?

1. Ultraviolet radiation in the formation of ozone gas :	Oxygen gas molecule absorbs ultraviolet radiation (UV) which causes the break down of its double covalent bond giving two free oxygen atoms, then each oxygen atom combines with an oxygen molecule forming ozone molecule. $O_2 \xrightarrow{UV} O + O$ $O + O_2 \longrightarrow O_3$
2. CO_2 in global warming phenomenon :	Increase of CO_2 in air causes trapping of infrared radiation in troposphere layer, which leads to the increase in the temperature of the planet Earth.
3. Infrared radiation in global warming :	Infrared radiation has a thermal effect, so when trapped in the troposphere layer this leads to increasing the planet Earth's temperature.

7 Give reasons for :

1. **The atmospheric pressure decreases on going above sea level.**
   Due to decreasing the length of air column and thus its weight decreases.
2. **The atmospheric pressure differs from an area to another on the Earth's surface.**
   Due to the difference in the length of air column from an area to another on the Earth's surface.
3. **Altimeter instrument is important for navigation.**
   Because it is used by pilots in aeroplanes to determine their elevations above sea level.
4. **Winds blowing from a region to another on the Earth's surface.**
   Due to the difference in atmospheric pressure from a region to another on the Earth's surface, where the wind moves from regions of high atmospheric pressure to that of low atmospheric pressure.
5. **The troposphere layer is called by this name.**
   Because all atmospheric turbulences take place in it.
6. **The temperature at the top of a mountain is less than that at its foot.**
   Because in troposphere layer, the temperature decreases as we go up by a rate (6.5°C) for each 1 km height.
7. **Rains, clouds and winds are present in troposphere layer.**
   Because it contains about 75% of the mass of atmospheric envelope.
8. **Troposphere layer regulates the Earth's temperature.**
   Because it contains 99% of atmospheric water vapour.

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9. **The air motion in troposphere layer is vertical.**
Because the hot air currents (less density) move upwards, while cold air currents (high density) move downwards.

10. **The stratosphere layer is called the ozonic atmospheric envelope.**
Because it contains most of ozone gas (O_3) which is found in atmospheric envelope.

11. **Temperature is high in the upper part of stratosphere layer.**
This is due to the absorption of ultraviolet rays (emitted from the Sun) by ozone layer, which is present at its upper part.

12. • **The lower part of stratosphere is suitable for flying aeroplanes.**
• **Pilots prefer to fly their aeroplanes in stratosphere.**
Because in this part, the air motion is horizontally and neither clouds nor weather turbulences exist.

13. **Mesosphere layer is called by this name.**
Because it is the middle layer.

14. **Mesosphere is the coldest layer.**
Because the temperature in such layer decreases with a high rate as we go up until it reaches (–90°C) at its top.

15. **Mesosphere layer is highly rarefied.**
Because it contains limited quantities of helium and hydrogen gases only.

16. **Luminous meteors are formed in mesosphere layer.**
Due to burning of some celestial rocky masses that enter the atmospheric envelope of Earth through mesosphere as a result of their friction with air molecules.

17. **The last layer of atmospheric envelope is called thermal layer.**
Because it is the hottest layer in atmospheric envelope.

18. **The upper part of thermosphere layer is called ionosphere.**
Because it contains charged ions.

19. **Ionosphere is important for radio stations.**
Because it reflects radio waves transmitted by radio stations and communication centres.

20. **Van-Allen Belts play an important role in protecting the Earth.**
Because they play an important role in scattering the harmful charged cosmic radiations away from the Earth.

21. **Occurrence of aurora phenomenon.**
Due to scattering of harmful charged cosmic radiations away from the Earth by Van-Allen Belts.

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22. Formation of ozone layer in the stratosphere layer.

Because stratosphere layer is the first layer in the atmospheric envelope which contains suitable amount of oxygen gas, faces ultraviolet radiations emitted from the Sun.

23. The ozone layer acts as a protective shield for living organisms.

Because it doesn't allow penetration of all far and most of medium ultraviolet radiations which have harmful chemical effects and threaten the life of living organisms.

24. Increasing the size of ozone hole in September every year.

Due to increasing the amount of pollutants which are emitted at this time every year.

25. Chlorofluorocarbon compounds are dangerous to the environment.

Because they cause erosion of ozone layer and global warming phenomenon.

26. Factories should stop their production of foam boxes.

To reduce the use of chlorofluorocarbon compounds as they are used in making foam backing.

27. Scientists decrease using freon as a cooling material.

Because freon causes erosion of ozone layer and global warming phenomenon.

28. Stop producing concorde aeroplanes.

Because their exhausts contain nitrogen oxides that affect the ozone layer.

29. Increasing the average temperature of the Earth's near-surface air during the last years

Due to increasing of greenhouse gases in the atmosphere.

30. Increasing in CO_2 gas percentage in the atmosphere.

Due to fossil fuel burning, cutting trees and forests fires.

31. Infrared radiation cannot penetrate the Earth's atmosphere.

Because it has a long wavelength.

32. Trading or producing CFC_s compounds is prohibited.

Because they cause erosion of ozone layer and global warming phenomenon.

33. Naming global warming phenomenon by greenhouse effect.

Because the Earth's atmosphere resembles the role of glass in greenhouse as it prevents penetration of infrared radiation causing increasing of the Earth's temperature.

34. The global warming phenomenon has negative effects on Earth.

Because it causes melting of the snow of both south and north poles and also it causes severe climatic changes.

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35. **Most countries are attempting to reduce the use of fossil fuel.**
To prevent increasing the percentage of CO_2 gas which increases the temperature of the planet Earth.

8 What happens when ... ?

1. **Diving into the depths of the sea [concerning the atmospheric pressure].**
The atmospheric pressure increases.
2. **Ascending upwards in troposphere [concerning the temperature and the atmospheric pressure].**
The temperature decreases with a rate 6.5°C for each 1 km height and the atmospheric pressure decreases.
3. **Descending downwards in stratosphere [concerning the temperature and the atmospheric pressure].**
The temperature decreases and the atmospheric pressure increases.
4. **Friction of space rocky masses with air molecules in mesosphere.**
They burn forming meteors.
5. **Harmful cosmic radiations collide with the ionosphere.**
The cosmic radiations are scattered which lead to the occurrence of Aurora phenomenon.
6. **Ultraviolet radiation hits oxygen molecule.**
The bond between oxygen molecule is broken down giving two free oxygen atoms (2O).
7. **Oxygen atom combines with oxygen molecule.**
Ozone molecule is formed.
8. **Existence of ozone in conditions of standard temperature and pressure (STP).**
The thickness of ozone layer will be 3 mm only.
9. **Overuse of methyl bromide gas as an insecticide.**
Erosion of ozone layer increases.
10. **Increasing in the percentage of nitrogen oxides in the atmospheric envelope.**
Erosion of ozone layer increases.
11. **Overuse of freon.**
Erosion of ozone layer increases and also the temperature of the Earth increases.
12. **Erosion of ozone layer over an area.**
Medium and far UV rays penetrate ozone layer and cause harmful effects.
13. **Increasing in the percentage of greenhouse gases in the atmosphere.**
Increasing the temperature of near-surface air of planet Earth.
14. **Infrared radiations don't reemit back from troposphere layer.**
Occurrence of greenhouse effect phenomenon which causes the increase in the planet Earth's temperature.

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15. Melting the snow of south and north poles.

The level of seas and oceans would increase and therefore :

- Disappearance of the coastal areas.
- Extinction of some polar animals like the polar bear and seals.

16. Earth's temperature increases [Concerning : the climatic changes].

Tropical hurricanes, destructive floods, drought waves and forests fires take place.

17. The continuous increase in consumption of fossil fuel.

The percentage of CO_2 gas increases in the atmospheric air by a continuous way which leads to occurrence of greenhouse effect phenomenon.

9 Comparisons :

1 Layers of atmospheric envelope :

Points of comparison	Troposphere layer	Stratosphere layer	Mesosphere layer	Thermosphere layer
• Thickness :	13 km.	37 km.	35 km.	590 km.
• Temperature :	– 60°C at its top.	0°C at its top.	– 90°C at its top.	1200°C at its top.
• Atmospheric pressure :	100 mbar at its top.	1 mbar at its top.	0.01 mbar at its top.	0.001 mbar.
• It contains :	- 75% of the mass of the atmospheric air. - 99% of atmospheric water vapour.	Most of ozone gas which is found in atmospheric envelope.	A limited amount of helium and hydrogen gases only.	Charged ions in its upper part.
• Air movement :	Vertically.	Horizontally.		

2 Ionosphere layer and exosphere layer :

P.O.C.	Ionosphere layer	Exosphere
• Definition :	It is a layer that contains charged ions and it exists in the upper part of thermosphere and extends up to 700 km above sea level.	It is a region in which the atmospheric envelope is inserted in outer space.
• Importance :	It is very important in wireless communications and broadcasting.	In which, satellites orbit around the Earth.

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3 Near ultraviolet rays and far ultraviolet rays :

Points of comparison	Near ultraviolet rays	Far ultraviolet rays
• The ratio of its penetration into the Earth's surface :	100 %	0 %
• Wavelength :	315 – 400 nm	100 – 280 nm
• Their effects on living organisms :	Useful	Harmful

4 Greenhouse effect and ozone hole :

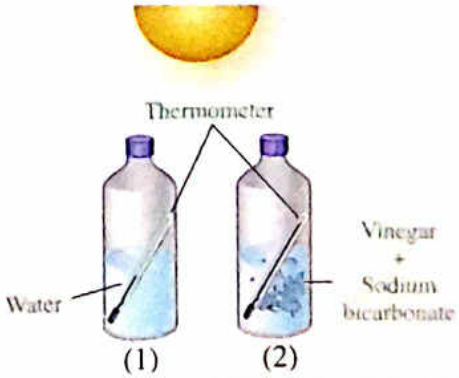
Points of comparison	Greenhouse effect	Ozone hole
• Causes :	Increasing the percentage of greenhouse gases in the atmosphere such as : • Nitrous oxide gas (N_2O). • Water vapour (H_2O). • CO_2 gas • CFC_s • Methane (CH_4).	The atmosphere contains compounds that pollute the ozone layer such as : • CFC_s • Methyl bromide gas. • Halons. • Nitrogen oxides gases.
• Harms :	Increasing the Earth's temperature causing global warming phenomenon.	Penetration of harmful ultraviolet rays to the Earth's surface which threaten the life of living organisms.

10 Activity :

Activity To know the greenhouse effect.

Tools :

- 2 empty soda bottles.
- 2 thermometers.
- Sodium bicarbonate powder.
- Water.
- Vinegar.



Note CO_2 gas is produced from the reaction between sodium bicarbonate and vinegar.

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Steps :

1. Pour some water in bottle (1) and the same amount of vinegar in bottle (2).
2. Insert a thermometer in each bottle.
3. Close bottle (1) and put some sodium bicarbonate powder in bottle (2) and close it immediately to keep CO_2 gas trapped.
4. Put both bottles in sunny place.

Observation :

Higher reading of the thermometer in bottle (2).

Conclusion :

The increase in the concentration of CO_2 gas leads to the increase in the temperature.

Similarly :

- The temperature of planet Earth has been increasing since 1935 due to increasing the greenhouse gases [especially CO_2].

11 Important drawings :

1 Aneroid instrument



2 Altimeter instrument

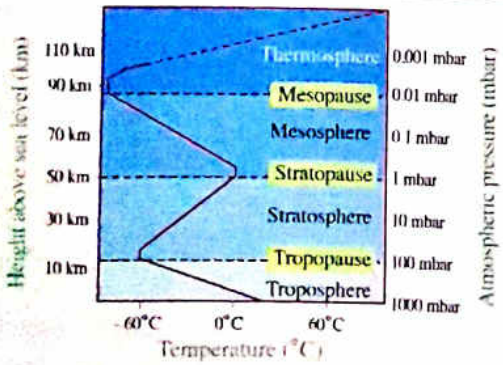


Analog Altimeter



Digital Altimeter

3 Layers of atmosphere

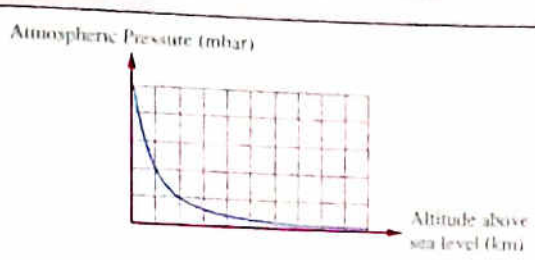


4 Van-Allen Belts



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5 The atmospheric pressure changes by changing the height above sea level



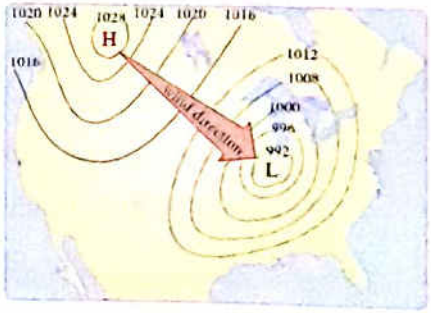
The relation between the altitude above sea level and the pressure [Inverse relationship]

12 Main points :

- The atmospheric pressure is measured in a unit called **a bar** or **millibar**.

  1 bar (b) = 1000 millibar (mbar).

- The normal atmospheric pressure = 1013.25 mbar.
- The atmospheric pressure increases by increasing the length of air column and vice versa.
- The density of air decreases on going above sea level.
- In atmospheric maps :
  - The areas of low atmospheric pressure are represented by "L".
  - The areas of high atmospheric pressure are represented by "H".



- The wind moves from the areas of high atmospheric pressure to the areas of low atmospheric pressure.
- The atmospheric envelope consists of four layers above sea level which are classified according to :
  - The change in atmospheric pressure.
  - The change in temperature.

*** Formation of ozone gas :**

1. Oxygen gas molecule (O_2) absorbs ultraviolet (UV) radiation, which causes the break down of the bond between the two oxygen atoms giving two free oxygen atoms (2O). $O_2 \xrightarrow{UV} O + O$

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2. Each oxygen atom combines with an oxygen molecule forming ozone molecule (O_3) which is composed of three oxygen atoms.

$$O + O_2 \longrightarrow O_3$$

* **Pollutants of ozone layer :**

1. Chlorofluorocarbon compounds.
2. Methyl bromide gas.
3. Halons.
4. Nitrogen oxides.

* **The most important greenhouse gases :**

1. Carbon dioxide gas (CO_2).
2. Chlorofluorocarbon compounds (CFC_s).
3. Methane gas (CH_4).
4. Nitrous oxide (N_2O).
5. Water vapour (H_2O).

* **Interpretation of the greenhouse phenomenon :**

When the concentration of greenhouse gases increases in the atmosphere, the atmosphere plays the role of glass in the greenhouse as :

1. It permits the visible light and short-waved rays produced from the Sun to pass.
2. The Earth and its components absorb these rays and reemit the radiation back in the form of infrared radiation.
3. When the rate of greenhouse gases increases in troposphere, the infrared radiation cannot penetrate the atmosphere, because it has a long wavelength.
   So, it is kept trapped in the troposphere causing the rise of planet Earth temperature (Greenhouse effect).

* **The ultraviolet radiation** has a chemical effect, while **infrared radiation** has a thermal effect.

* **The negative effects of global warming phenomenon :**

(1) Melting the snow of both south and north poles :

Melting of polar ice would increase the level of seas and oceans, which leads to :

1. Disappearance of the coastal areas.
2. Extinction of some polar animals like the polar bear and seals.

(2) Severe climatic changes :

Among these features is the repeated occurrence of :

1. Tropical hurricanes such as hurricane Katrina in 2005.
2. Destructive floods.
3. Drought waves.
4. Forests fires.

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Final Revision on Unit 3

1 Definitions (or scientific terms) :

1. Fossils :	They are traces and remains of old living organisms that are preserved in sedimentary rocks.
2. Trace :	Traces of an old living organism indicate its activity during its life.
3. Remains :	Traces that indicate the remains of an old living organism after death.
4. A complete body fossil :	It is a fossil that keeps the whole shape and all the details of the body of the living organism as a result of its rapid burying as soon as it died in a medium that preserves it from decomposition.
5. Amber :	It is the solidified resinous matter which was secreted by pine trees in old geologic ages.
6. Solid mold fossil :	It is the replica of the internal details of the structure of an old living organism left after its death in sedimentary rocks.
7. Cast fossil :	It is the replica of the external details of the structure of an old living organism left after its death in sedimentary rocks.
8. Petrified fossils :	They are fossils in which minerals replace the organic matter of an old living organism, after its death, part by part leaving the shape without any change.
9. Petrification :	It is the process of conversion of the parts of old living organisms to rocky materials as a result of replacing the organic material of the organism with minerals, part by part.
10. Petrified woods :	They are fossils which are formed as a result of replacing the wood material of trees with minerals, part by part, giving us details about the life of an old plant.
11. Index fossils :	They are fossils of organisms that had lived for a short period of time in the past and had a wide geographical range, then became extinct.
12. Fossil record :	The sequence of fossils in sedimentary rocks layers according to their sequence of appearance from simple to complicated.
13. Extinction :	• It is the continuous decrease without compensation in the number of a certain species of living organisms until all members of species die out. • It is dying out of all members of species of living organisms.
14. Food chain :	It is a path of energy that transfers from a living organism to another in the ecosystem.

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15. Food web :	It is a group of food chains connected with each other.
16. Simple ecosystem :	It is an ecosystem that has a few members and it is strongly affected by the absence of one of its species.
17. Complicated ecosystem :	It is an ecosystem that has multiple members and it is not affected much by the absence of one of its species.
18. Natural protectorates :	They are safe areas established to protect endangered species in their homeland.

2 Importance (or the role of) :

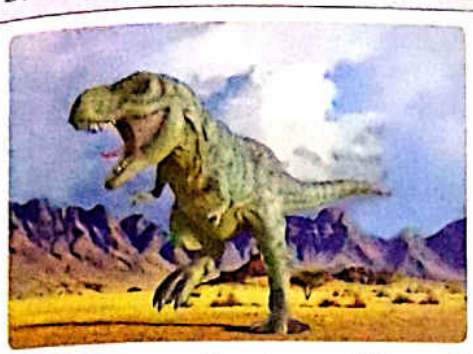
Item	Importance (or the role of)
1. Fossils :	• Age determination of sedimentary rocks. • Figuring out the paleoenvironment. • Studying life evolution. • Petroleum exploration.
2. Index fossils :	They indicate the age of sedimentary rocks existed in them.
3. Nummulites fossils :	They indicate that El-Mokattam mountain was a sea floor more than 35 million years ago.
4. Coral fossils :	They indicate that the environment where they lived was clear warm shallow seas.
5. Ferns fossils :	They indicate that the environment where they lived was a hot and rainy tropical environment.
6. Fossil record :	It indicates the sequence of fossils in sedimentary rocks layers according to their sequence of appearance from simple to complicated.
7. Microfossils (foraminifera and radiolaria) :	They indicate that : • The age of rocks existed in exploratory wells. • The suitable conditions of petroleum formation.
8. Natural protectorate :	It protects endangered species in their homeland.
9. Papyrus plant :	Pharaohs used it to manufacture writing papers.
10. Yellowstone protectorate :	It protects grey bear from extinction.
11. Panda protectorate :	It protects Panda bear from extinction.
12. Ras Mohamed protectorate :	It protects rare species of coral reefs and coloured fish from extinction.
13. Wadi El-Hetan in Wadi El-Raiyan protectorate :	It contains complete whales' skeleton fossils (40 million years ago).

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3 Important tables :

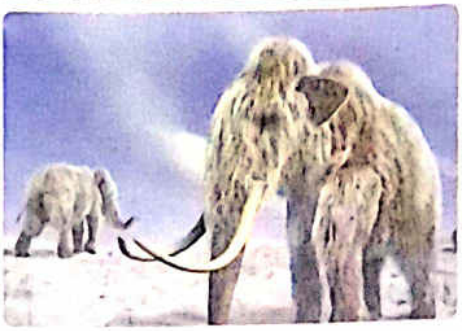
1 Extinct species in the old times :

1 Dinosaur :



Dinosaur became extinct from millions of years ago.

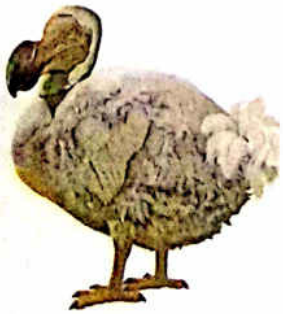
2 Mammoth :



Mammoth is called the grandfather of recent elephant.

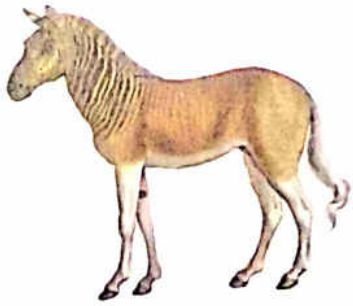
2 Extinct species in the recent times :

1 Dodo bird :



It is a non-flying bird due to the reduced size of its wings.

2 Quagga :



- It is a mammal animal.
- It is considered the midway between horse and zebra.

3 Endangered species :

1 Panda bear :



2 Rhinoceros :



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3 Ibis bird :



4 Barbary sheep (Arui) :



5 Papyrus plant :



It is used by pharaohs to manufacture writing papers.

6 Bald eagle :



It is called bald because its head is covered with white feathers which make it looks like bald.

4 The important world's protectorates :

Protectorate	Location	Protected kinds
1. Yellowstone protectorate :	USA	Grey bear 
2. Panda protectorate :	Northeastern China.	Panda bear 

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5 Egypt's important protectorates :

Protectorate	Location	Protected kinds
1. Ras Mohamed protectorate : The first established protectorate in Egypt in 1983.	South Sinai governorate.	Rare species of coral reefs and coloured fish 
2. Wadi El-Hetan (part of Wadi El-Raiyan protectorate) :	El-Fayoum governorate.	Complete whales'skeleton fossils (40 million years ago). 

4 Give reasons for :

1. **Mammoth fossil is preserved as a complete body fossil.**
   Because when it died, it was rapidly buried in snow which preserved it from decomposition.
2. **Amber is considered as a suitable medium for formation of complete body fossils.**
   Because it preserved the bodies of insects inside it from decomposition.
3. **Ammonites fossil is classified as a mold fossil.**
   Because it is a replica of the internal details of the snail of ammonites.
4. **Formation of petrified woods fossils.**
   Due to replacing the organic matter of wood by minerals part by part.
5. **Naming the petrified forest with wood mountain.**
   Because it contains petrified woods which look like rocks.
6. **The petrified woods are considered from fossils although they look like rocks.**
   Because they give us the details about the life of an old plant.
7. **El-Mokattam mountain was a part of a sea floor more than 35 million years ago.**
   Due to the presence of nummulites fossils in the limestone rocks of El-Mokattam mountain.

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8. Nummulites fossils are considered as index fossils.

Because they indicate the age of sedimentary rocks, as the age of rocks is the same age of fossils existed in them.

9. Not all known fossils are considered as index fossils.

Because the index fossils are the fossils of living organisms that lived for a short period of time in the past and had a wide geographic distribution, then became extinct and these conditions are not available in all fossils.

10. Fossils are important in petroleum exploration.

Because the presence of foraminifera and radiolaria in the rocks of the exploratory wells indicate the suitable conditions of petroleum formation.

11. • Occurrence of macro extinctions for many living organisms.

• Extinction of dinosaurs.

Due to : - Meteorite impacts with Earth.
- The violent Earth movement.
- Exposure of the Earth to long ice age.
- Toxic (poisonous) gases which evolved from volcanoes.

12. Occurrence of recent extinction.

Due to : - Destroying natural habitat. - Overhunting.
- Environmental pollution. - Climatic changes and natural disasters.

13. Dodo bird was an easy target for hunters.

Due to the reduced size of its wings, so it is a non-flying bird.

14. Naming the bald eagle by this name.

Because its head is covered with white feathers which make it looks like bald.

15. • The simple ecosystem is significantly affected by the absence of one of its species.

• Desert ecosystem is significantly affected by the absence of one of its species.

Due to the rarity of alternative that compensates the absence of this species.

16. Tropical forest is a complicated ecosystem.

Because it is a system containing a large number of members of living organisms and it is not affected by the absence of any species.

17. • It is important to reproduce the endangered species and send them back to their native habitats.

• Scientists attempt to establish a gene bank for some types of living organisms.

To protect the rare and endangered living organisms from extinction.

18. Some governments are interested in establishing natural protectorate areas.

To protect endangered living organisms in their homeland.

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19. **Yellowstone is an important natural protectorate.**
Because it protects grey bear from the danger of extinction.

20. **World organizations are interested in studying the environment of Ras Mohamed protectorate.**
Because it contains rare species of coral reefs and coloured fish.

21. **Wadi El-Hetan is considered the most important area in Wadi El-Raiyan protectorate.**
Because it contains complete whales'skeleton fossils (40 million years ago).

5 What are the consequences of each of the following ... ?

1. **An organism is buried fast after death in snow.**
A complete body fossil of it is formed.

2. **Dipping the old insects in amber.**
The bodies of insects are preserved inside it from decomposition.

3. **The solidification of the mineral sediments inside a snail, then the decomposition of its shell over millions of years.**
A solid mold fossil for snail is formed which carries the internal details of its structure.

4. **Putting a clam's shell on the surface of a flat piece of clay and pressing it gently.**
A cast of shell is formed carrying the external details of its shell.

5. **Minerals replace wood material part by part of an old tree.**
It changes into petrified wood.

6. **Extinction of a species from a balanced ecosystem.**
It causes a cavity in the path of energy in this ecosystem that would disturb the ecosystem equilibrium or destroy it.

7. **The absence of one type of species from the simple ecosystem.**
It is strongly affected due to the rarity of alternative that compensates this absence.

6 Comparisons :

1 Mammoth fossil and amber fossil :

Mammoth fossil	Amber fossil
Burying of mammoth after death immediately in snow which preserved it from decomposition.	Immersing insects in resinous matter (which was secreted by pine trees) that solidified and preserved the bodies of these insects inside it from decomposition.

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2 Trace and remains :

Trace	Remains
Traces indicate the activity of an old living organism during its life. ***Ex. :*** Traces of worm's tunnels.	Traces indicate the remains of an old living organsim after death. ***Ex. :*** Remains of dinosaur's skull.

3 Mold and cast :

Mold	Cast
It is the replica of the internal details of the structure of an old living organism left after its death in sedimentary rocks. ***Ex. :*** Trilobite fossil.	It is the replica of the external details of the structure of an old living organism left after its death in sedimentary rocks. ***Ex. :*** Fish cast.

4 Mold and trace :

Mold	Trace
It is the replica of the internal details of the structure of an old living organism leaving them in the sedimentary rocks after death. ***Ex. :*** Nummulites fossil.	Traces that indicate an activity of an old living organism leaving them in sedimentary rocks during its life. ***Ex. :*** Dinosaur's foot print.

5 Cast and trace :

Cast	Trace
It is the replica of the external details of the structure of an old living organism leaving them in sedimentary rocks after death. ***Ex. :*** Cast of ferns.	Traces that indicate an activity of an old living organism leaving them in sedimentary rocks during its life. ***Ex. :*** Worms' tunnels.

6 Coral fossils and ferns fossils :

Coral fossils	Ferns fossils
They indicate that the environment where they lived was clear warm shallow seas.	They indicate that the environment where they lived was hot and rainy tropical environment.

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7 Nummulites fossil and foraminifera fossil :

Nummulites fossil	Foraminifera fossil
It indicates that the area of El-Mokattam mountain was a sea floor more than 35 million years ago.	It indicates that : - The age of rocks existed in exploratory wells. - The suitable conditions of petroleum formation.

8 Simple and complicated ecosystems :

Simple ecosystem	Complicated ecosystem
- It is characterized by containing a few number of members of living organisms (few members). - It is strongly affected by the absence of one of its species, because of the rarity of alternative that compensates this absence. *Ex. :* Desert.	- It is characterized by containing a large number of members of living organisms (multiple members). - It is not affected much by the absence of one of its species, because it has many alternatives. *Ex. :* Tropical forest.

7 Important figures :

1 Examples of traces :

Worm's tunnels



Dinosaur's foot print



2 Examples of remains :

Remains of a dinosaur's skull



Remains of shark's teeth



3 Examples of solid mold fossils :

Ammonites fossil



Nummulites fossil

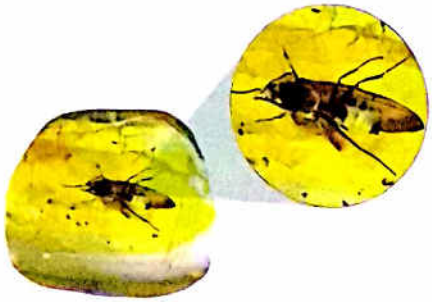


Trilobite fossil



4 Examples of complete body fossils :

Amber fossil

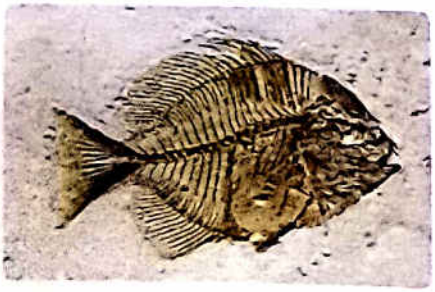


Mammoth fossil



5 Examples of cast fossils :

Fish cast



Cast of ferns



6 Examples of petrified fossils :

Petrified wood



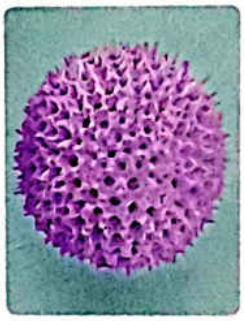
Petrified dinosaur's eggs



Petrified dinosaur's tooth



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7 Coral fossil :	8 Archaeopteryx fossil :
	
9 Radiolaria :	**10 Foraminifera :**
	

8 Main points :

*** How is the solid mold fossil formed ?**

- When a snail (or clam) dies, it falls on the sea floor, where its soft parts decomposed leaving the shell which is buried in sediments.
- The sediments fill up the shell cavities and solidify as the time passes.
- The shell decomposes completely, leaving a solid rock mold carrying the internal details of the snail.

*** Suitable conditions for fossils formation (or preservation) :**

1. Presence of hard skeleton of organism.
2. The body of the organism must be buried immediately after death in a medium that preserves it from decomposition.
3. The existence of a suitable medium in which the mineral of rocks replaces the organic material of the living organism.

*** Studying the fossil record showed that :**

1. Life started first in sea then established on land.
2. Organisms developed from simple to complicated as :
   - Algae appeared before mosses and ferns.
   - Gymnosperms appeared before angiosperms.

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- Invertebrates (such as corals and mollusks with shells) appeared before vertebrates.
- Fish were the first vertebrates that appeared, followed by amphibians, then reptiles, and finally birds and mammals appeared together.

* **Archaeopteryx fossil is considered a link between reptiles and birds.**

* **Reasons of extinction :**

A. Reasons of extinction in old ages [macro extinctions] :

Many scientists attributed macro extinctions of some living organisms (like extinction of dinosaurs) due to occurrence of :

1. Meteorite impacts with Earth.
2. The violent Earth movement.
3. Exposure of the Earth to long ice age.
4. Toxic (poisonous) gases which evolved from volcanoes.

B. Reasons of extinction in recent ages :

Recent extinction occurred now is caused by different factors.
Most of them are due to the interference of man with nature such as :

1. Destroying natural habitat.
2. Overhunting.
3. Environmental pollution.
4. Climatic changes and natural disasters.

* **Examples of some extinct species in old times :**

- Dinosaur.
- Mammoth.

* **Examples of some extinct species in the recent times :**

- Dodo bird [It is a non-flying bird].
- Quagga [It is considered the midway between horse and zebra].

* **Examples of endangered species :**

- Panda bear.
- Rhinoceros.
- Bald eagle.
- Ibis bird.
- Papyrus plant.
- Barbary sheep.

* **Ways to protect rare and endangered living organisms from extinction :**

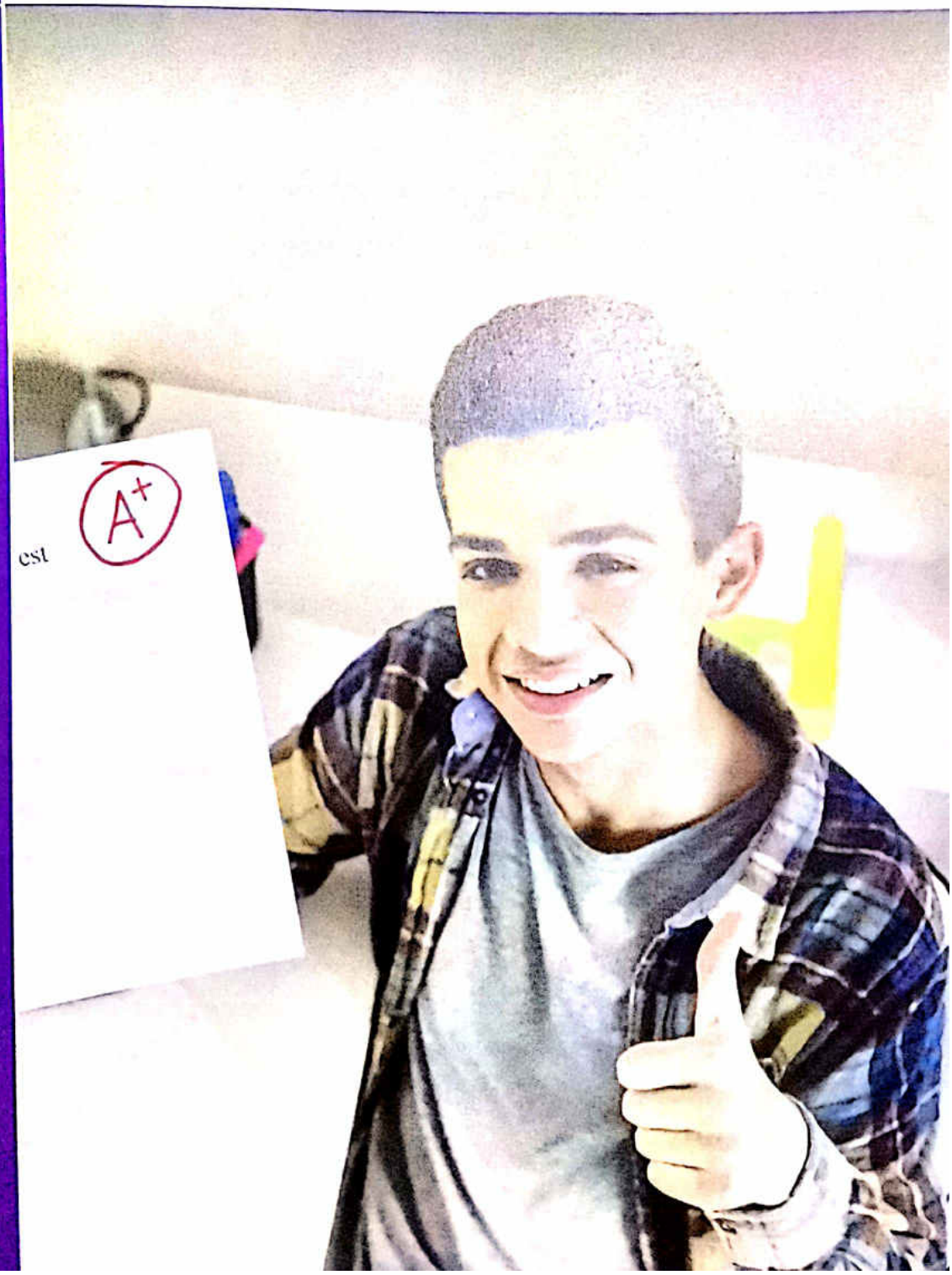
1. Putting laws which regulate the process of hunting of living organisms especially the rare types.
2. Increasing the awareness about the importance of natural life to sustain the existence of mankind.
3. Breeding and reproducing the endangered species and sending them back to their native habitats.
4. Establishing gene banks for the endangered species.
5. Establishing natural protectorate areas.

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PART 3

Final Examinations

Final Examinations of Some Governorates 2022



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Final Examinations of Some Governorates 2022

1 Cairo Governorate — Leaders Language School

Answer the following questions :

Question 1

A Complete the following sentences :

1. Mosely put ..... and ..... series below his periodic table.
2. During chemical reaction, metals tend to ..... outer electrons taking the structure of the nearest ..... nobel gas.
3. Iodine is found in ..... state, while bromine is found in ..... state.
4. ..... were the first vertebrate appeared and followed by .....

B Write the scientific term of each of the following sentences :

1. Two magnetic belts help in scattering of harmful cosmic radiations away from the Earth.
2. An ozone pollutant that is used as an insecticide.
3. A water pollutant that causes death of brain cells.
4. Descending arrangement of metals according to their chemical activity.

C Represent the next reactions by balanced chemical equations :

1. Reaction of magnesium oxide with water.
2. Reaction of bromine with potassium iodide.

Question 2

A Give reasons for :

1. Mammoth fossil is preserved as a complete body fossil.
2. The simple ecosystem is severely affected by absence of one of its species.
3. Increasing CO_2 gas percentage in the atmosphere.
4. Cesium is the strongest metal in the modern periodic table.

B Cross out the odd word, then write the scientific term of the rest :

1. Sodium / Cesium / Lithium / Chlorine.
2. Silicon / germanium / Magnsium / Tellurium.
3. Freon / Water vapour / Halons / Nitrogen oxides.
4. Aneroid / Barometer / Hofmann's voltameter / Altimeter.

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C Problem :

Find the temperature at a point of height 3000 meters above the sea level, if the temperature at the sea level is (30°C).

Question 3

A Choose the correct answer :

1. ..... layer in atmosphere that is suitable for flying planes.
   a. Troposphere b. Stratosphere c. Thermosphere d. Mesosphere
2. ..... discovered the main energy levels in the atom.
   a. Bohr b. Mendeleev c. Mosely d. Rutherford
3. ..... causes blindness when its ratio increases in drinking water.
   a. Arsenic b. Iron c. Lead d. Mercury
4. ..... is used in preservation of eye cornea.
   a. Liquefied sodium b. Liquefied nitrogen
   c. Silicon d. Cobalt

B Write one importance of :

1. Exosphere layer.
2. Ras Mohamed protectorate.
3. Foraminifera microfossil.
4. Ferns fossil.

C Locate the following elements in the modern periodic table :

1. $_{19}K$
2. $_{10}Ne$

Question 4

A What happens when ... ?

1. The sediments fill up the empty snail, then the outer shell is decomposed.
2. We go from up to down in group 7A.
3. Hydrogen bonds were absent between water molecules. (concern boling point).
4. Halogens react with metals.

B Put (✓) or (✗), then correct the false one (s) :

1. Meteors are formed in the thermosphere layer. ( )
2. Infrared radiation has chemical effect. ( )
3. Petrified fossil was formed by replacing organic substances with minerals. ( )
4. Dinosaurs were extinct due to over hunting. ( )

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C **Mention the number representing each of the following :**

1. Thickness of stratosphere layer.
2. Temperature at the top of mesosphere.

2 Cairo Governorate — Manor House International School

Answer the following questions :

Question 1

A **Complete the following sentences :**

1. Mendeleev arranged the elements ascendingly according to .....
2. The highest temperature layer in the atmosphere is .....
3. $MgO + H_2O \longrightarrow$ .....
4. Dodo bird is from the ..... bird.

B **Correct the underlined words :**

1. **Copper** reacts instantly with water and hydrogen gas evolved.
2. Panda bear is considered from **extinct** species.
3. **Inert gases** have the properties of metals and nonmetals.
4. All weather phenomena like rain, wind and clouds occur in the **ionosphere layer**.

C **What happen when ... ?**

Decreasing the temperature of water to less than 4°C.

Question 2

A **Choose the correct answer :**

1. ..... replace(s) the wood organic material, part by part of an old tree.
   a. Plastic b. Iron c. Minerals d. Copper
2. Ozone layer is found in ..... layer.
   a. troposphere b. mesosphere c. thermosphere d. stratosphere
3. The density of ice is ..... the density of water.
   a. less than b. more than c. equal to d. double of
4. The atomic number of an element that exists in group (7A) and period (2) is .....
   a. 12 b. 7 c. 9 d. 17

B **Put (✓) or (✗) in front of the following statements :**

1. The atomic size decreases in the same group as atomic number increases. ( )
2. The air moves horizontally in the lower part of stratosphere. ( )
3. Amber is a complete body fossil. ( )
4. Halogens are monovalent elements. ( )

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C Problem :

If the temperature at the sea level is 20.6°C. Find the temperature at the top of a mountain of height 2 km above Earth's surface. [Don't forget the rule].

Question 3

A Write the scientific term of each of the following sentences :

1. It's the addition of any substance to the water which causes continuous gradual change in water properties affecting the health and the life of living creatures.
2. The death of all members of species of living organisms.
3. A device that is used to measure the elevation above the sea level.
4. The radioactive element that is used in food preservation.

B Mention one example for each of the following :

1. Halogen is found in solid state.
2. Fossil of a complete body.
3. Covalent compound cannot dissolve in water.
4. The strongest metallic element.

C Locate the following elements in the modern periodic table showing your steps :

1. $_{13}Al$
2. $_{10}Ne$

Question 4

A Determine the odd word :

1. Rhinoceros / Panda bear / Quagga / Bald Eagle.
2. Sodium / Potassium / Silver / Iron.
3. Sugar / Animal wastes / Lead / Mercury.
4. Bromine / Chlorine / Nitrogen / Fluorine.

B Mention the importance of :

1. The ozone layer.
2. The liquefied nitrogen.
3. The Hoffman's voltameter.
4. The aneroid.

C Give a reason for :

Solution of carbon dioxide changes the color of blue litmus paper into red.
[Write your answer and the chemical equation that represents this reaction].

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3 Cairo Governorate

Answer the following questions :

Question 1

A Complete the following sentences :

1. The strongest nonmetal lies in group ....., while the strongest metal lies in group .....
2. ..... is the coldest layer in the atmosphere, while ..... is the hottest layer.
3. $2Mg + O_2 \xrightarrow{\Delta}$ .....
4. ..... is from extinct mammals, while ..... is from endangered mammals.

B Mention one example for :

1. A covalent polar compound.
2. A device used to measure the atmospheric pressure.
3. An endangered plant.
4. Halogen in a liquid state.

C Problem :

If the volume of the gas evolved above the cathode of Hofmann's voltameter is 10 cm^3.
Calculate the volume of the gas evolved above the anode.
And mention the name of the gas above the anode and the gas above the cathode.

Question 2

A Choose the odd word out, then write the scientific term of the others :

1. $_9F$ / $_6C$ / $_{35}Br$ / $_{17}Cl$.
2. CO_2 / O_2 / N_2O / CH_4.
3. Cast / Fossil of a complete body / Fossil record / Mold.
4. Dodo bird / Bald eagle / Ibis bird / Rhinoceros.

B Put (✓) or (✗) in front of the following statements :

1. The modern periodic table consists of (17) horizontal periods and (8) vertical groups. ( )
2. Potassium oxide is considered from basic oxide. ( )
3. Ozone molecule consists of four oxygen atoms. ( )
4. Temperature decreases by 6.5°C at 2 km above the sea level. ( )

C Compare between :

The Florine ($_9F$) and Cesium ($_{55}Cs$)
(According to : 1- The kind of each of them. 2- Atomic size of each of them.)

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Question 3

A Choose the correct answer :

1. Ozone degree is measured in a unit that is called .....

   a. Km b. nm c. Dobson d. Pm

2. Eating fish which contain high concentration of ..... causes the death of brain cells.

   a. mercury b. arsenic c. lead d. iron

3. ..... is an example of microfossils.

   a. Fern b. Foraminifera c. Mammoth d. Amber

4. The upper (3) layers of atmosphere contain ..... of water vapor.

   a. 1% b. 25% c. 75% d. 99%

B Write the scientific term of each of the following sentences :

1. An arrangement of metals in a descending order according to their chemical activity.
2. A phenomenon looks like a colorful light curtains seen at the two poles of the Earth.
3. Remains of old living organisms that are preserved in sedimentary rocks.
4. The continuous increase of the average temperature of the air near the surface of the Earth.

C What happens if ... ?

1. Putting a piece of sodium in water.
2. Harmful cosmic radiations collide with the ionosphere.

Question 4

A Choose from column (B) what suits it in column (A) in the following tables :

1-

(A) Probably harms	(B) Responsible pollutant
1. Blindness	a. sodium.
2. Death of brain cells	b. lead.
3. Cancer of liver	c. mercury.
4. Bilharzia and hepatitis	d. mixing water with human and animal wastes.
	e. arsennic.

1. ..... 2. ..... 3. ..... 4. .....

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2-

(A)	(B)
1. Liquid sodium	a. is used in preservation of food.
2. Liquefied nitrogen	b. is used in manufacture of electronic device.
3. Cobalt 60	c. is used in nuclear reactor.
4. Silicon slides	d. is used to easy studying of the chemical and physical properties of elements.
	e. is used in preservation of the eye cornea.

1. ..... 2. ..... 3. ..... 4. .....

B Fill the following spaces :

1. Name of this group is .....
2. Atomic number of element (X) = ...
3. Atomic size of element (Y) is ..... than atomic size of element (X).
4. The atoms of elements of this group form ..... ion in the chemical reactions.

Li
Na
X
Rb
Y
Fr

C Locate the following elements in the modern periodic table :

1. $_{10}Ne$ 2. $_{8}O$

4 Cairo Governorate — El-Helmia Official Language School

Answer the following questions :

Question 1

A Complete the following sentences :

1. Ultraviolet rays have ..... effect, while infrared rays have ..... effect.
2. Mendeleev arranged elements according to their ....., whereas Moseley arranged elements according to their .....
3. The hottest atmospheric layer is ....., while the coldest layer is .....
4. Elements of group (1A) are called ....., while elements of group (7A) are called .....
5. The strongest metallic element is ....., and the strongest nonmetallic element is .....

B Mention the importance of :

1. Cobalt 60. 2. Altimeter.

Question 2

A Give reasons for :

1. Pilots prefer to fly their planes in the lower part of stratosphere layer.
2. Liquefied nitrogen is used in preservation of the eye cornea.
3. Desert is a simple ecosystem.
4. Establishing natural protectorates.

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B **Locate the following elements in the modern periodic table :**

1. $_{17}Cl$ 2. $_{18}Ar$

C **Compare between :**

Troposphere and stratosphere, according to the atmospheric pressure at its top and its thickness.

Question 3

A **Write the scientific term of each of the following sentences :**

1. It is a weak electrostatic attraction force arises between molecules of polar compounds.
2. The ability of atom in the covalent molecule to attract the bond electrons to itself.
3. Remains and traces of old living organisms that lived in the past for certain period then became extinct.
4. Atomspheric layer that plays an important role in wireless communication.

B **What is meant by ... ?**

Atmospheric pressure.

C **Complete the following equations :**

1. $2KBr + Cl_2 \longrightarrow$ .....
2. $2Na + 2H_2O \longrightarrow$ .....

Question 4

A **Choose the correct answer :**

1. Ozone layer is found in ..... layer.
   a. troposphere b. mesosphere c. stratosphere
2. ..... is an example of extinct animal in the old age.
   a. Dodo bird b. Quagga c. Dinosaur
3. ..... is the measuring unit of the degree for ozone layer.
   a. Picometer b. Dobson c. Nanometer
4. ..... protectorate is the first natural protectorate established in Egypt.
   a. Wadi Hetan b. Ras Mohammed c. Saint Catherine

B **Calculate :**

The temperature at the top of a mountain, if you know that the temperature at its foot is 27°C and its height is 3 km.

C **What happens when ... ?**

1. One of species in a complicated ecosystem extincted.
2. Concentration of mercury increases in drinking water.

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5 Cairo Governorate

St. Joseph School

Answer the following questions :

Question 1

A Give reasons for :

1. El-Mokattam mountain was a sea floor more than 35 million years ago.
2. The atmospheric pressure decreases by increasing the altitude above the sea level.
3. Pilots prefer to fly their planes in the lower part of stratosphere.
4. The atomic size increases as we go down through the same group in the modern periodic table.

B Complete the following sentences :

1. The ..... layer protects the Earth from celestial rocky masses.
2. $2K + Cl_2 \longrightarrow$ .....
3. ..... is an example of endangered species.
4. ..... are example of metalloid elements.

C Write the contributions of the following scientists in chemistry :

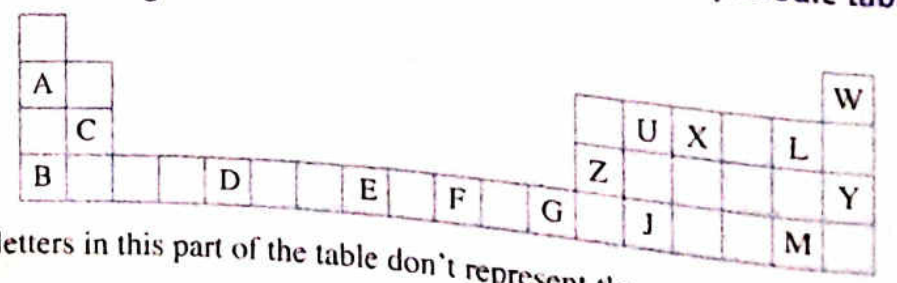
1. Bohr.
2. Rutherford.

Question 2

A Choose the correct answer :

1. ..... is example of microfossils.
   a. Foraminifera b. Dinosaur c. Papyrus plant d. Dodo bird
2. Burning carbon in oxygen produces .....
   a. CO b. CO_2 c. H_2CO_3 d. (a & c)
3. ..... used in fire extinguisher.
   a. Halons b. CFC_s compounds c. Nitrous oxides d. Oxygen
4. The crystals of ice take ..... shape.
   a. quintet b. quadrilateral c. octogenarian d. hexagonal

B Study the following figure which represents a section of the periodic table, then answer the following :



[NB. The letters in this part of the table don't represent the actual symbols of elements]

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What is/are the symbol which indicates the ... ?

1. Inert gases.
2. Halogens.
3. d-block elements.
4. Higher active metal.
5. Highest electronegativity element.

C Give an example of each of the following :

1. Extinct species in the old geological ages.
2. Greenhouse gases.

Question 3

A Write the scientific term of each of the following sentences :

1. It is the weight of air column of an atmospheric height on a unit area.
2. It is the addition of any substance to the water, which causes continuous gradual change in water properties affecting the health and the life of living creatures.
3. The remains or traces of organisms that lived in the past and were preserved in sedimentary rocks.
4. It is curved lines that join the points of equal pressure in atmospheric pressure maps.
5. The continuous decrease without compensation in the number of a certain species of living organisms until members of species dies out.

B 1. Write the balanced chemical equations representing the following reactions :

1. The reaction between magnesium and dilute hydrochloric acid.
2. The reaction between bromine and potassium iodide.

2. Locate the following elements in the modern periodic table :

1. $_{20}Ca$
2. $_{1}H$

C Write the important of each of the following :

1. Ozone layer.
2. Cobalt 60.
3. Hofmann's voltameter.
4. Moseley's periodic table.
5. Ionosphere.

Question 4

A Compare between :

1. Mold and Cast (according to definition and example).
2. Aneroid and Altimeter (according to its importance).

B Correct the underlined words :

1. Each period ends with **a nonmetal**.
2. When water freezes its density **doesn't change**.
3. The normal degree of ozone is **200 Dobson**.
4. **Panda bear** is one of extinct species.
5. **Thermosphere layer** contains 75% of the mass of the atmospheric air.

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C **Mention the atomic number of each of the following elements :**

1. The element, which is located in the second period and in group (7A).
2. The element, which is located in the third period and in group (1A).
3. The element, which is located in the first period and in group (18).

6 Giza Governorate — Egypt Dream Language School

Answer the following questions :

Question 1

A **Complete the following sentences :**

1. ..... is a type of barometers used to determine the possible day weather, while ..... is instrument used to measure the altitude of airplanes above the sea level.
2. The coldest layer of the atmospheric envelope is called ....., while all weather phenomena are present in the ..... layer.
3. When temperature of water becomes less than 4°C its density ....., while its volume .....
4. ..... is an endangered bird, while ..... is an endangered mammal.

B **Write the scientific term :**

1. The addition of any substance to water, which causes continuous gradual change in water properties affecting the health and life of living organisms.
2. Trapping of infrared radiation in troposphere due to the increase in the percentage of greenhouse gases.
3. The death of all members of species of living organisms.
4. Thinning of ozone layer above the south pole.

C **Problem :**

Find the temperature at a point of height 10 km above the sea level, if the temperature at the sea level is 24°C.

Question 2

A **Choose the correct answer :**

1. The element whose atomic number equals 18 is considered ..... element.
   a. transition b. inert gas c. metallic

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2. In the periodic table, the elements which are similar in their chemical properties are located in the same .....

a. period. b. energy level. c. group.

3. Water has a/an ..... effect on litmus paper.

a. acidic b. neutral c. basic

4. In water electrolysis, if the volume of the evolved gas above the cathode is 8 cm^3, so the volume of the evolved gas above the anode is ..... cm^3.

a. 16 b. 8 c. 4

B You have 3 elements X, Y and Z of atomic numbers 2, 9 and 12 respectively, answer the following :

1. Determine their location in the modern periodic table.
2. Calculate the atomic number of the element, which follows element Z in the same group.

C Give an example of each of the following :

1. Greenhouse gases. 2. Simple ecosystems.

Question 3

A Give reasons for :

1. The temperature at the top of a mountain is less than that at its foot.
2. Stop producing concorde aeroplanes.
3. Oil doesn't dissolve in water.
4. Wadi El-Hetan is considered as the most important area in Wadi Al-Rayan protectorate.

B Correct the underlined words :

1. The angle between the two covalent bonds of water molecule is **180°**.
2. The ozone layer extends from **20 to 30 km** above the sea level.
3. Pilots prefer to fly their aeroplanes in the lower part of **mesosphere**.
4. Magnesium reacts with dilute HCl and Cl_2 gas evolves.

C What is meant by ... ?

1. The chemical activity series. 2. Food web.

Question 4

A Complete the following sentences :

1. The ultraviolet radiation has ..... effect, while infrared radiation has ..... effect.

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2. Elements of s-block are located on the ..... side of the periodic table, and they are arranged in two groups which are ..... and .....
3. The valency of group 7A elements is .....
4. Bromine exists in a ..... state, while iodine exists in a ..... state.

B Choose out the odd symbol or word :

1. Na_2O / MgO / CO_2 / CaO
2. F_2 / Cl_2 / Br_2 / C
3. Cast / Mold / Fossil record / Petrified fossil.
4. Nitrogen oxides / Water Vapor / Freon / Halons.

C What happens when ... ?

1. Harmful cosmic radiations collide with ionosphere.
2. Burning a magnesium strip inside a test tube that contains oxygen.

7 Giza Governorate — 6th October Directorate

Answer the following questions :

Question 1

A Complete the following sentences :

1. Elements of group (7A) are called ....., and they have a valancy equals .....
2. F-block consists of 2 series which are called ..... and .....
3. Thickness of ozone layer is ..... Dobson or ..... mm.
4. ..... is considered as a linkage between birds and reptiles.
5. The strongest metal is ....., and strongest nonmetal is .....
6. The hottest atmospheric layer is .....

B Give reasons for each of the following :

1. Troposphere organizes the temperature of the Earth.
2. Group (1A) are called alkali metal.
3. In each group of the modern periodic table, the elements are similar in their chemical properties.

C How can you locate the following elements in the modern periodic table ?

1. $_{11}Na$
2. $_{2}He$

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Question 2

A Put (✓) or (✗) in front of the following statements :

1. The infrared rays has a chemical effect. ( )
2. Water decomposes by electrolysis into oxygen and hydrogen. ( )
3. Acidic oxides turn litmus paper into blue. ( )
4. The first protectorate in Egypt is Blue Stone protectorate. ( )
5. Fossil record indicates that life is started on land then in sea. ( )
6. The s-block in the modern periodic table contains 2 groups. ( )

B Write the use (importance) for each of the following :

1. Cobalt 60. 2. Altimeter. 3.Van-Allen Belts.

C If you know the volume of the gas that evolves at the anode during water electrolysis is 30 cm^3, calculate the volume of the gas that evolves at the cathode and write the name of the two gases.

Question 3

A Write scientific term :

1. Elements that have properties of metals and nonmetals.
2. Ability of the atom to attract the electrons of the covalent bond towards itself.
3. Weak electrostatic attraction that arises between molecules of water.
4. Continuous increase in the Earth temperature.
5. Dying out of all member of certain species.
6. The scientist who discovered the main energy levels.

B Complete the following equations :

1. $CO_2 + H_2O \longrightarrow$ .....
2. $2H_2O \xrightarrow{\text{electrolysis}}$ ..... + ...
3. $Br_2 + 2KCl \longrightarrow$ .....

C Cross out the odd one :

1. F_2 / Br_2 / Cl_2 / Na
2. s-block / p-block / d-block / m-block.

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Question 4

A Choose the correct answer :

1. Metal oxides are called ..... oxides.
   a. acidic b. amphoteric c. basic d. salty
2. Transition elements start to appear in period number .....
   a. 2 b. 4 c. 3 d. 6
3. The region between mesosphere and thermosphere is called .....
   a. mesopause. b. stratopause. c. thermopause. d. troposphere.
4. A type of ultraviolet rays that is absorbed completely (100%) in ozone layer is ..... UV.
   a. far b. near c. medium d. thermal
5. All the following are endangered species, except .....
   a. panda bear. b. quagga. c. bald eagle. d. ibis bird.
6. ..... is from nobel gases.
   a. Cesium b. Sodium c. Neon d. Potassium

B Give an example for each of the following :

1. Extinct animal. 2. Greenhouse gas. 3.Cast fossil.

C Compare between : Biological pollution and Chemical pollution of water (regarding harms).

8 Giza Governorate — Kerdasa Directorate

Answer the following questions :

Question 1

A Choose the correct answer :

1. Mendeleev arranged elements in an ascending order according to their ..... , while Moseley arranged the elements in an ascending order according to their .....
   a. atomic number – atomic weight. b. atomic weight – atomic number.
   c. atomic weight – atomic weight. d. atomic number – atomic number.

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2. The transition elements starting to appear from period ..... , and they lie at the ..... of the periodic table.

a. 3–upper b. 4–middle c. 4–upper d. 4–bottom

3. The atomic number of the element which lies in period (3) and group (7A) is .....

a. 15 b. 17 c. 10 d. 7

4. Each period in the modern periodic table starts with ....., and ends with .....

a. metal–nonmetal. b. metal–metalloid.

c. metal–metal. d. metal–Nobel gas.

B Arrange the following ascendingly :

1. $^{23}_{11}Na$, $^{39}_{19}K$, $^{27}_{13}Al$, $^{24}_{12}Mg$ (according to their atomic size)

2. $_{9}F$, $_{35}Br$, $_{53}I$, $_{17}Cl$ (according to their nonmetallic properties)

3. Fish, Mammoth, Trilobite, Archaeopteryx.

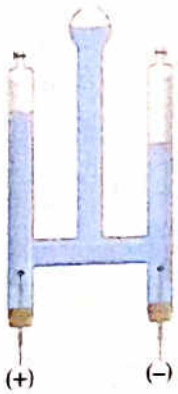
(according to their appearance on the life)

4. Types of ultraviolet rays : (Far, Medium and Near)

(according to their wave length)

C Problem :

Calculate the collected volume of the gas at the negative pole, if you know that the collected volume of the gas at the positive pole was 5 cm^3.



Question 2

A Complete the following sentences :

1. ..... is an extinct bird, while ..... is an endangered bird.

2. ..... is radioactive isotope which is used in preservation of food because it emits ..... ray.

3. The type of bonds between water molecules are ..... , while the type of bonds between its atoms are .....

4. If the atomic number of an element is 15 , this means that it lies in period number ..... and group number .....

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B **Show by a chemical equations, How to obtain each of the following :**

1. Sodium chloride from sodium metal.
2. Magnesium hydroxide from magnesium metal.

C **Classify each of the following :**

1. $_4Be$, $_1H$, $_5B$, $_8O$ (into : metals , nonmetals and metalloids).
2. Dinosaur's eggs fossil – Fern fossil – Ammonites fossil – Amber fossil. (into : different types of fossils)

Question 3

A **Complete the following table :**

	Stratosphere	Troposphere
Thickness	..... (1)	..... (2) .....
Temperature (at its top)	..... (3)	..... (4) .....
Pressure (at its top)	..... (5)	..... (6) .....
Air movement	..... (7)	..... (8) .....

B **Give reasons for each of the following :**

1. Elements of the same group in the modern periodic table have the same chemical properties.
2. Sulphur dioxide is an acidic oxide.
3. Stopping manufacturing of concord aeroplanes.
4. Liquefied nitrogen is used in preservation of cornea of the eye.

C **Mention the use (importance) of each of the following :**

1. Altimeter.
2. Ionosphere.

Question 4

A **Write the scientific term for the following statements :**

1. The ability of the atom in a covalent molecule to attract the electrons of the bond.
2. Safe areas which established to protect the endangered species in their homeland.
3. The mammal that is considered the midway between horse and zebra.
4. The path of energy from a living organism to another in an ecosystem.

B **Complete the following chemical equations :**

1. $Br_2 + KCl \longrightarrow$ .....
2. $Mg + 2HCl \longrightarrow$ ..... + ...
3. $2Na +$ ..... $\longrightarrow$ ..... $+ H_2$
4. ..... $+ H_2O \longrightarrow H_2CO_3$

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C Problem :

Find the temperature at a point of height 3.5 kilometers above the sea level, if the temperature at the sea level is 23° C.

9 Alexandria Governorate — Taymour English School

Answer the following questions :

Question 1

A Write the scientific term :

1. They are safe areas established to protect the endangered species in their homeland.
2. It is a phenomenon that appears as brightly light curtains seen at both poles of the Earth.
3. Block of elements that arranged into two horizontal series at the lower part of the modern periodic table.
4. It is the arrangement of metals in a descending order according to the degree of their chemical activity.
5. Curved lines that join the points of equal pressure in the atmospheric pressure maps.
6. The rays that are trapped in the troposphere causing greenhouse effect.

B Give one example for :

1. An element that has zero electronegativity.
2. An endangered organism.
3. A pollutant that causes both ozone layer erosion and global warming.
4. A semi-metal element that is used in electronic devices.
5. An amphoteric oxide.

C Problem :

Calculate the temperature at a height 7252 meters above the sea level.
(Knowing that the temperature at the sea level equals 22°C).

Question 2

A Give reasons for :

1. All bases are not considered alkalis.
2. Pilots prefer to fly their aeroplanes in the lower part of stratosphere layer.
3. Desert is considered as a simple ecosystem.
4. Bald eagle is called by this name.

B An element which is located in period (3) and group (5A).
Find its atomic number and the name of its block in the modern periodic table.

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C **Correct the underlined words :**

1. **Quagga** is a link between reptiles and birds.
2. **Covalent** bonds between water molecules is a **strong** bond.
3. Mesosphere is **the ozonic** layer as it contains a limited amounts of **ozone**.
4. **Mendeleev** discovered the positive protons.

Question 3

A **Mention one use for :**

1. Aneroid barometer. 2. Liquified Nitrogen. 3. Van-Allen Belts.

B **What is the effect of the following on health ?**

1. Throwing human wastes in water.
2. Throwing mercury in water.
3. Filling plastic bottles with tap water.

C **Show the effect of diluted hydrochloric acid on both magnesium and sulphur. (with the balanced chemical equation).**

D **Choose the correct answer :**

1. The transition elements are found in .....
   a. s-block. b. d-block. c. f-block. d. p-block.
2. The correct order to arrange $_{5}B$, $_{20}Ca$, $_{12}Mg$ and $_{13}Al$, descendingly according to the atomic size is .....
   a. Ca > Al > B > Mg
   b. Ca > Al > Mg > B
   c. Ca > Mg > Al > B
   d. B > Al > Mg > Ca
3. The element that is found in group (1A) which and kept under paraffin oil and not kept under kerosene is .....
   a. sodium. b. cesium. c. lithium. d. bromine.
4. The temperature in troposphere reaches ..... at its top.
   a. Zero°C b. - 90°C c. 1200°C d. - 60°C
5. The element which emits rays and can be used in preservation of food is .....
   a. Cobalt 60 which emits alpha rays.
   b. Cobalt 60 which emits gamma rays.
   c. Cobalt 50 which emits alpha rays.
   d. Cobalt 70 which emits gamma rays.
6. The strongest nonmetal in the modern periodic table, is .....
   a. sodium. b. cesium. c. fluorine. d. astatine.
7. The normal atmospheric pressure is ..... at the sea level.
   a. 100 mbar b. 101325 mbar c. 1013.25 bar d. 1013.25 mbar

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Question 4

A Complete the following sentences :

1. ..... is a solidified resinous material which was secreted by pine trees in the old ages.
2. $Cl_2 + 2\ KBr \longrightarrow$ ..... + ...
3. Hydrogen gas is collected above ..... during water electrolysis.
4. Petrified woods considered as fossils in which the organic material of trees is replaced with .....
5. ..... is an example of complete body fossil which were buried under .....
6. ..... and foraminifera are microfossils, their presence indicates the formation of .....

B Write a property for :

1. Potassium.
2. Tropical forest.

C Answer the following questions :

1. Show by equations how ozone is formed.
2. Write an achievement for Bohr.
3. Mention one difference between helium and fluorine.

10 Alexandria Governorate — El-Agamy Directorate

Answer the following questions :

Question 1

A Choose the correct answer :

1. All the following are greenhouse gases, except .....
   a. nitrous oxide. b. water vapour. c. carbon dioxide. d. methyl bromide.
2. The measuring unit of atomic radius is .....
   a. picometer. b. Dobson. c. gm. d. cm^3.
3. From the old extinct animals, ...
   a. panda bear. b. bald eagle. c. mammoth. d. quagga.
4. From the examples of amphoteric oxide .....
   a. CO_2 b. Al_2O_3 c. MgO d. N_2O

5. The inert gas that exists in period three has atomic number equals .....
   a. 3 b. 18 c. 10 d. 7
6. The scientist who was discovered the main energy levels, ...
   a. Bohr. b. Mosley. c. Mendeleev. d. Rutherford.

B Give reasons for :

1. Silicon slides are used in the manufacture of electronic devices.
2. El-Mokattam mountain was a sea floor since 35 million years.
3. The lower part of stratosphere is suitable for flying the aeroplane.
4. The water is polar compound.

Question 2

A Write the scientific term of the following :

1. Thinning or losing parts of the ozone layer at the south pole.
2. Dying out all members of one species of living organisms.
3. The ability of an atom in a covalent molecule to attract the electrons of bond toward itself.
4. Safe area that are established to protect endangered species in their homeland.
5. The arrangement of metals in descending order according to their chemical activity.
6. A water pollutant that causes the death of brain cells.

B Give one difference between the following :

1. Acidic oxides and basic oxides.
2. Thermosphere and mesosphere.
3. Simple ecosystems and complicated ecosystems.

C What's meant by ... ?

1. Metalloids.
2. Fossils.

Question 3

A Complete the following sentences :

1. The transition elements start to appear from period number ....., and consists of ..... groups.
2. Ultraviolet radiations has ..... effect, and inferared rays has ..... effect.
3. Archaeopteryx fossil is a link between ..... and .....
4. The new number of group (6A) is ....., and the new number of group zero is .....
5. Mesopause is the area between ..... layer and ..... layer.

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B Locate the following elements in the modern periodic table :

1. $_{10}Ne$ 2. $_{6}C$ 3. $_{14}Si$ 4. $_{3}Li$ 5. $_{20}Ca$

C Write the balanced chemical equations of the following :

1. Burning a piece of coal.
2. Magnesium with diluted hydrochloric acid.
3. Sodium with water.
4. Chlorine with potassium bromide.

Question 4

A Put (✓) or (✗) in front of the following statements, then correct the wrong ones :

1. Yellowstone protectorate established to protect panda bear from extinction. ( )
2. Index fossils are used to determine the age of sedimentary rocks. ( )
3. Ionosphere layer lie at height 20 km from the sea level. ( )
4. The liquid halogen is chlorine. ( )
5. The atmospheric pressure decreases by increasing the altitude from the sea level. ( )
6. Traces indicate the activity of living organisms during their life. ( )

B What happens when ... ?

1. Solidification of resinous matter that secreted from pine tree in old geological age on an insect.
2. Van-Allen Belts scattering the harmful cosmic radiations.
3. Absence of one member species from a simple ecosystem.

C Problem :

If the temperature at the sea level 26 °C, find the temperature at the top of a mountain with a height equals 4000 m.

11 Alexandria Governorate — El-Montazah Directorate

Answer the following questions :

Question 1

A Complete the following :

1. From the basic oxides ..... , while ..... is an example of acidic oxide.
2. Most weather phenomena occur in the ..... layer, while meteors are formed in ..... layer.

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3. Chlorine can replace ..... and ..... in a solution of their salts.
4. In group (1A) the lowest active metal is ..... , while the most active element is .....

B Mention the following :

1. A solid halogen.
2. An endangered plant.
3. A kind of ultraviolet rays absorbed completely by the ozone layer.

C Problem :

If the temperature at the foot of a mountain equals 13°C. Find the temperature at its top if its height equals 2 km.

Question 2

A Choose the correct answer :

1. ..... indicates the extinction.
   a. Fossils b. Protectorate c. Evolution d. Rocks
2. Increasing the ratio of ..... element in drinking water causes blindness.
   a. lead b. mercury c. arsenic d. boron
3. The scientist ..... discovered that the nucleus of an atom contains positive protons.
   a. Rutherford b. Moseley c. Mendeleev d. Bohr
4. All the following elements are located in the same group, except .....
   a. $_{19}K$ b. $_{11}Na$ c. $_{12}Mg$ d. $_{3}Li$
5. A halogen locates in the second period, so its atomic number equals .....
   a. 7 b. 9 c. 17 d. 19
6. All the following gases are greenhouse gases, except .....
   a. H_2O b. CO_2 c. N_2O d. SO_2

B Show by balanced chemical equation each of the following :

1. Reaction of bromine with potassium iodide.
2. Reaction between magnesium and dilute hydrochloric acid.

C Mention one importance of :

1. Liquefied nitrogen.
2. Methyl bromide gas.

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Question 3

A Correct the underlined words :

1. Each period in the modern periodic table, ends with **a nonmetal**.
2. The commercial name of $C.F.C_s$ is **calcium fluoride**.
3. The complete body fossil of mammoth is preserved in **amber**.
4. The temperature decreases to **90°C** at the end of the troposphere layer.
5. The measuring unit of the atomic size is **cm**.
6. The transition elements start to appear at period number **3**.

B Locate the following elements in the modern periodic table :

1. $_9F$
2. $_{13}Al$

C Mention one difference between :

1. Simple ecosystem and complicated ecosystem.
2. Altimeter and aneroid.

Question 4

A Write the scientific term :

1. The ability of an atom of a covalent molecule to attract the electrons of the chemical bond toward itself.
2. The continuous decrease in the number of a certain species until they all die out.
3. The layer that contains charged ions, that is used in wireless communication.
4. They are bonds exist between water molecules.
5. The weight of air column of an atmospheric height on a unit area.

B Give reasons for :

1. Water have a high boiling point.
2. Piolets prefer to fly their planes at the lower part of the stratosphere layer.
3. Mendeleev considered that isotopes are different elements.

C Cross out odd word, then write the scientific term of the other :

1. Bald eagle / Rhinoceros / Ibis bird / Quagga.
2. $_{12}Mg$ / $_{13}Al$ / $_{11}Na$ / $_3Li$
3. Neon / Nitrogen / Helium / Argon.

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12 Alexandria Governorate — East Alexandria Directorate

Answer the following questions :

Question 1

A Complete the following sentences :

1. The number of elements in Mendeleev's periodic table is ..... elements.
2. The scientist ..... discovered the main energy levels of the atom.
3. Fossils are often found in ..... rocks.
4. The normal atmospheric pressure equals ..... mbar at the sea level.

B Write the scientific term of each of the following sentences :

1. The block that contains the groups from (3A) to (0).
2. The polar compound that consists of one oxygen atom and two hydrogen atoms.
3. The number of positive protons inside the nucleus of the atom of an element.
4. The halogen which exists in a liquid state.

C From the opposite figure :

1. What is the name of this group ?
2. What is the valency of its elements ?

X
II Y
Z
L
M

Question 2

A Choose the correct answer :

1. Complete body fossils of insects are found preserved in .....
   a. ammonites. b. amber. c. igneous rooks. d. air.
2. All of the following gases are greenhouse gases, except .....
   a. O_2 b. CO_2 c. N_2O d. CH_4
3. There are ..... bonds among water molecules.
   a. hydrogen b. covalent c. ionic d. metallic
4. ..... is not considers from halogens.
   a. Sodium b. Chlorine c. Florine d. Iodine

B Put (✓) or (✗) in front of the following statements :

1. Papyrus is considered as an extinct plant. ( )
2. Cobalt 60 emits gama rays. ( )
3. The complete body fossil of mammoth found preserved in snow. ( )
4. Both oil and sugar are covalent compounds. ( )

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C **Compare between :**

Mesosphere and thermosphere "concerning : importance – temperature at its top".

Question 3

A **Choose from column (B) what suits it in column (A) :**

(A)	(B)
1. Sodium	a. is used in extinguishing fires.
2. Carbon	b. is a metal.
3. Halon	c. is used in making foam backing.
4. Freon	d. is a nonmetal.

1. ..... 2. ..... 3. ..... 4. .....

B **Correct the underlined words :**

1. The thickness of ozone layer in the stratosphere layer is (60) km.
2. The element which is located in period (3) and group (3A) is $_5$B.
3. **Mesopause** is located between stratosphere and mesosphere layers.
4. **Tap water** doesn't affect litmus paper.

C **Give a reason for the following :**

Liquefied nitrogen is used in the preservation of cornea of the eye.

Question 4

A **Cross out the odd word :**

1. Dinosaur / Panda bear / Dodo Bird / Quagga.
2. Mosses / Reptiles / Invertebrates / Fish.
3. Helium / Neon / Hydrogen / Argon.
4. Silicon / Bromine / Boron / Arsenic.

B **Give an example for each of the following :**

1. Traces of an old living organism.
2. Negative effects of global warming phenomenon.
3. One of the natural water pollutants.
4. A basic oxide.

C **Express with a balanced chemical equation :**

The reaction between magnesium and diluted hydrochloric acid.

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13 Qalyoubia Governorate — Science Inspectorate

Answer the following questions :

Question 1

A Complete the following sentences :

1. In the modern periodic table, elements which are similar in their chemical properties are located in the same .....
2. In the modern periodic table, d-block contains ..... elements.
3. An example of polar compounds is ..... , that has a neutral effect on litmus solution.
4. The strongest nonmetal element locates in group ..... in the modern periodic table.

B Give an example for each of the following :

1. An endangered plant.
2. A pollutant of ozone layer.
3. An extinct non-flying bird.
4. An element that doesn't react with water.

C Locate the following elements in the modern periodic table :

1. $_{11}Na$ 2. $_{20}Ca$

Question 2

A Write the scientific term for each of the following :

1. They are safe areas established to protect endangered species in their homeland.
2. The descending arrangement of metals according to their chemical activity.
3. The region between troposhere and stratosphere.
4. The block that contains the series of lanthanides and actinides.

B Mention the measuring unit for each of the following :

1. The atomic size of the element.
2. The degree of ozone.
3. The atmospheric pressure.

C Problem :

If the temperature at the sea level is 30°C. Find the temperature at a height of 6 km.

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Question 3

A Choose the correct answer :

1. All of the following are greenhouse gases, except .....
   a. CO_2 b. O_2 c. N_2O d. CH_4
2. P-block contains ..... groups.
   a. 10 b. 2 c. 6 d. 8
3. The ..... replaces the wood material, part by part of an old tree.
   a. copper b. iron c. sodium d. minerals
4. During electrolysis of water the volume of evolved oxygen gas is ..... the volume of evolved hydrogen gas.
   a. equal to b. half c. twice d. quarter

B Complete the following equations :

1. $Cl_2 + 2\ KBr \longrightarrow$ ..... + ...
2. $MgO + H_2O \longrightarrow$ .....
3. $CO_2 +$ ..... $\longrightarrow H_2CO_3$

C Mention one difference between :

Simple ecosystem and complicated ecosystem.

Question 4

A Correct the underlined words :

1. When water freezes, its density **increases.**
2. The modern periodic table contains **100** elements.
3. **Methyl bromide gas** used in extinguishing fires.
4. The complete body fossil of **mammoth** is found preserved in amber.

B Put (✓) or (✗) in front of the following statements, then correct the wrong ones :

1. Infrared radiation has a chemical effect. ( )
2. Altimeter is used for determining the possible day weather. ( )
3. Foraminifera are from microfossils. ( )
4. Meteors are formed in stratosphere layer. ( )

C Give a reason for each of the following :

1. Pilots prefer to fly their planes in the lower part of stratosphere.
2. Mendeleev left gaps in his periodic table.

المعاصر علوم لغات (Notebook) / ع٢ / ترم ١ (م : ١٩)

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14 Menofia Governorate — Shebien El-Koum Directorate

Answer the following questions :

Question 1

A Complete the following sentences :

1. Sodium is kept under the surface of ..... to prevent its reaction with .....
2. Mesosphere layer is highly rarefied, because it contains a limited quantities of ..... and ..... gases only.
3. ..... + ... $\longrightarrow$ H_2CO_3
4. Fossils are used in ..... exploration and determining the age of .....

B Study the opposite figure which represents a part of the modern periodic table, then answer the following questions by using it :

$_1H$						
$_3Li$	$_4Be$	$_5B$	$_6C$	$_7N$	$_8O$	
$_{11}Na$						
$_{19}K$						

1. The element that has the highest electronegativity is .....
2. The element that has the greatest atomic size is .....
3. This part represents the group number ..... and the period number .....
4. The element which has the lowest metallic property in this group is .....

C Write the balanced chemical equation, that illustrate the reaction between chlorine and potassium bromide.

Question 2

A Choose the correct answer :

1. The average age of the lower layers of sedimentary rocks is ..... that of its upper layers.
   a. more than b. less than c. equal
2. ..... contains charged particles and it has an importance in wireless communications.
   a. Mesosphere b. Stratosphere c. Ionosphere
3. The kind of rays which are emitted from cobalt 60 is .....
   a. ultraviolet rays. b. infrared radiation. c. gamma rays.
4. (X) is an alkali metal that reacts with oxygen to form a chemical compound known as .....
   a. X_2O_2 b. X_2O c. XO_2

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B Cross out the odd word or symbol:

1. Al^{+3} / Na^{+1} / Mg^{+2} / O^{-2}
2. Dodo bird / Panda bear / Bald eagle / Papyrus plant.
3. Oxygen gas / Organic fertilizers / Animals wastes / Mercury.
4. Saint cathrine / Ras mohamed / Wadi El-Hetan / Petrified forest.

C Problem :

Calculate the height of a mountain if temperature at its foot is 30°C and at its top is – 9°C.

Question 3

A Write the scientific term for each of the following :

1. It is the weight of air column of atmospheric height on a unit area ($1m^2$).
2. Replacing part by part of the wood material of an old tree by minerals to form petrified wood.
3. Elements which have the properties of both metals and nonmetals.
4. A water pollutant, which causes the death of brain cells.

B Choose the correct word from inbetween brackets :

(bromine – lose electron(s) – increases – HCl – decreases – iodine – gain electron(s) – CO_2)

1. The halogen which exists in a solid state is .....
2. The density of air ..... as we go up.
3. During a chemical reaction, a metal atom tend to .....
4. The most important greenhouse gas is .....

C What is the difference between ... ?

Simple ecosystems and complicated ecosystems.

Question 4

A Correct the underlined words :

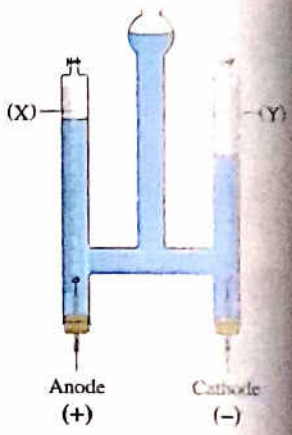
1. Some **salts** dissolve in water forming alkalis.
2. **Halons** are produced among the burning of fuel of supersonic aeroplanes.
3. Amber protects the **mammoth** inside it from decomposition.
4. The cast is a replica of the **interior** details of an ancient living creature.

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B **Give reasons for :**

1. Sugar is dissovling in water although it is a covalent compound.
2. Occurrence of aurora phenomenon.
3. The global warming phenomenon has negative effects on the Earth.
4. El-mokattam's mountain was a sea floor more than 35 million years ago.

C When the electrolysis of acidified water done by using Hofmann's voltammeter (as shown in opposite fig.)
If the sum of the two evolved gases (x) and (y) is 24 cm^3 calculate the volume of each one of the two evolved gases.



15 Dakahlia Governorate — Science Inspectorate

Answer the following questions :

Question 1

A **Complete the following sentences :**

1. Elements are classified in the modern periodic table according to the increasing of their ....., and the way of filling of their ..... with electrons.
2. When sodium reacts with water, ... solution is formed and ..... gas evolved.
3. Most of weather phenomena occur in ..... layer, whereas satellites orbit through the .....
4. ..... and ..... are considered as suitable media for the formation of a complete body fossils.

B **The following table represents a section of the modern periodic table :**

A											G		R		X	E	
B	Z											D		M			
Y		N		H		C											

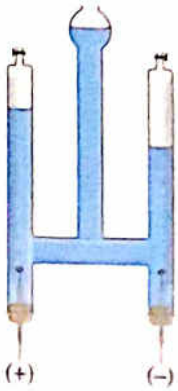
(The letters in this section don't represent the actual symbols of elements).

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What is the symbol indicates each of the following ?

1. The element that has the most metallic property, is .....
2. The element that locates in period (3) and group (6A), is .....
3. The element that has atomic number equals 12, is .....
4. The element that gains one electron during chemical reaction, is .....

C **The opposite figure illustrates the apparatus that is used in the electrolysis of water :**



1. Write the balanced chemical equation of this process.
2. Calculate the volume of the gas at the positive pole, if the volume of the gas at the negative pole is 5 cm^3.

Question 2

A **Write the scientific term for each of the following :**

1. The block that contains the series of lanthanides and actinides.
2. A type of ultraviolet radiation that is absorbed completely by the ozone layer.
3. Electrostatic attraction that originates between the molecules of some polar compounds.
4. Fossils indicate that the environment where they found was clear warm shallow seas.

B **Correct the underlined words :**

1. **Calcium and magnesium** react with hot water vapour only.
2. Some covalent compounds such as **oil**, can form hydrogen bonds with water molecules.
3. Part of Wadi El-Raiyan protectorate contains **coloured fishes and coral reefs**.
4. An ammonite fossil represents a mold of **an insect.**

C **Show by chemical equations the role of ultraviolet radiation in the formation of ozone gas.**

Question 3

A **Answer according to that in bracts :**

1. $_6C$ / $_{11}Na$ / $_8O$ / $_{19}K$ / $_9F$ (arrange in ascending order according to their atomic radius).
2. (Who) discovered that the nucleus of an atom contains positively charged protons.
3. There are two dangerous phenomena that facing the Earth, which are erosion of ozone layer in mesosphere and global warming in stratosphere (correct the sentence).
4. An extinct bird with small wings, and it was an easy target for hunters (name the organism).

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B **Put (✓) or (✗) in front of the following statements :**

1. The nonmetallic property increase gradually as we go from top to bottom in the same period, in the modern periodic table. ( )
2. An element has atomic number equals 7, so the atomic number of the element that follow it in the same group equals 18. ( )
3. CFCs compounds are from the reasons of ozone hole and global warming. ( )
4. The atmospheric pressure increases on going under the sea level, due to decreasing the length of air column. ( )

C **Show by symbolic balanced chemical equation :**

1. The reaction of magnesium with diluted hydrochloric acid.
2. The reaction of sodium metal with chlorine gas.

Question 4

A **Cross out the odd word. Then write the scientific term of the rest :**

1. Overhunting / Environmental pollution / Meteorite impact the Earth / Destroying natural habitat.
2. Panda bear / Ibis bird / Bald eagle / Quagga.
3. Pilot prefers to fly in it / It is surrounded by Van-Allen Belts / The temperature at its top equals 0°C / Its thickness equals 37 km.
4. $_{2}He$ / $_{10}Ne$ / $_{16}S$ / $_{18}Ar$

B **Choose the correct answer :**

1. The chemical properties of $_{20}Ca$ are similar to those of .....
   a. $_{19}K$ b. $_{12}Mg$ c. $_{15}P$ d. $_{3}Li$
2. ..... in its salt solution.
   a. Iodine replaces chlorine
   b. Iodine replaces bromine
   c. Chlorine replaces bromine
   d. Bromine replaces chlorine
3. A liquid boils at 100°C what is the other property, which confirms that it is a pure water ? .....
   a. Salt dissolves in it.
   b. Its density decreases on freezing.
   c. It evaporates on heating.
   d. It has a neutral effect on both litmus papers.
4. Luminous meteors are formed in ..... layer.
   a. the coldest b. the disturbed c. the hottest d. the ozone

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C A metallic element (M) which is located in period (3) and when it reacts with oxygen a compound its formula (M_2O_3) is formed, what is its atomic number and what is its block in the modern periodic table.

16 Gharbia Governorate — Science Inspectorate

Answer the following questions :

Question 1

A Complete the following sentences :

1. Fluorine and chlorine exist in a ..... state, while iodine exists in a ..... state.
2. If the volume of the evolved gas at the anode in Hofmann's voltameter is 7 cm^3 , therefore the volume of the evolved ..... gas at the cathode is ..... cm^3.
3. The thickness of the mesosphere layer is ..... km.
4. ..... protectorate is the first established natural protectorate in Egypt.

B Correct the underlined words :

1. **Freon** is used as an insecticide to preserve stored agricultural crops.
2. Temperature decreases by **(6.5°C)** at 2 km above the sea level.
3. An element that is located in period (3) and group (2A), has atomic number equals **(13)**.
4. Each period starts with a strong **nonmetal**, except the first period.

C Write the balanced chemical equations which express the following reactions :

1. Magnesium with dilute hydrochloric acid.
2. Electrolysis of water.

Question 2

A Write the scientific term of the following :

1. Curved lines that join the points of equal pressure in atmospheric pressure maps.
2. Trace that indicates the remains of an old living organism after its death.
3. They are elements that have the properties of both metals and nonmetals.
4. It is a table in which the elements are arranged in an ascending order according to their atomic weights.

B Cross out the odd word, then write the scientific term of the others :

1. CO_2 / MgO / Na_2O / CaO.
2. Lithium / Sodium / Potassium / Helium.
3. Cast / Fossil of a complete body / Fossil record / Mold.
4. Rhinoceros / Panda pear / Dodo bird / Bald eagle.

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C **What would happen when ... ?**

The snow of both south and north poles of the Earth is melting.

Question 3

A **Put (✓) or (✗), then correct the false one(s) :**

1. Archaeopteryx represents a link between reptiles and mammals. ( )
2. Water and ammonia are from polar compounds. ( )
3. Aurora phenomenon appears as colored brightly light curtains seen at both north and south poles of the Earth. ( )
4. Both nitrogen ($_7$N) and carbon ($_6$C) are located in the same group in the modern periodic table. ( )

B **Answer the following questions :**

1. Locate the following elements in the modern periodic table :

   1. $_{10}$Ne 2. $_{19}$K

2. Calculate the height of a mountain, if the temperature at its foot is (30°C) and at its top is (– 6°C).

C **Compare between :**

Old extinction - recent extinction (concerning : their causes)

Question 4

A **Choose the correct answer :**

1. The complete body fossil of a mammoth is found preserved in .....

   a. amber. b. snow. c. ocean. d. sedimentary rocks.

2. The strongest nonmetal locates in group .....

   a. 7A b. 1B c. 1A d. 2A

3. All the following diseases are caused by biological water pollution, except ..... disease.

   a. liver cancer b. bilharzia c. hepatitis d. typhoid

4. The path of energy that transfers from a living organism to another is known as .....

   a. food web. b. food pyramid. c. food chain. d. food type.

B **Give an example for :**

1. A halogens that presents in a liquid state.
2. An endangered plant.
3. A radiation that has a thermal effect.
4. A metal that doesn't react with water.

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C **Give reasons for :**

1. The tropical forest is a complicated ecosystem.
2. Not all known fossils are considered index fossils.

17 Damietta Governorate — Damietta Directorate

Answer the following questions :

Question 1

A **Complete the following sentences :**

1. The scientist Mosely arranged the elements ascendingly according to their .....
2. The strongest nonmetal element locates in group ..... in the modern periodic table.
3. Satellites rotate in .....
4. Fossils are found in ..... rocks.

B **Correct the underlined words :**

1. The element which has an atomic number equals (18) is **a metallic element**.
2. There are **covalent** bonds between water molecules.
3. MgO is an **acidic** oxide.
4. Each period starts with a **weak metal**.

C **If half the volume of the gas evolved above the anode of Hofmann's voltameter is 5 cm. calculate the volume of the gas evolved above the cathode. And how can you detect it practically ?**

Question 2

A **Write the scientific term for the following :**

1. The ability of an atom in the covalent compound to attract the electrons of the chemical bond towards itself.
2. A type of water pollution from dumping of the atomic (nuclear) wastes in seas and oceans.
3. It is a path of energy that transmits from a living organism to another in the ecosystem.
4. A type of ultraviolet radiation that does not penetrate the ozone layer with a percentage 100 %.

B **Mention one example for each of the following :**

1. A covalent polar compound.
2. A liquid halogen.
3. An endangered plant.
4. An extinct bird.

C **Calculate the temperature at a point of height 2 km. above the sea level, if the temperature at the sea level is 24°C.**

المعاصر علوم لغات (Notebook) / ٤٢ / تيرو ١ (م : ٢٠)

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Question 3

A Choose the correct answer :

1. The chemical properties of calcium ($_{20}$Ca) are similar to those of .....
   a. $_{19}$K b. $_{3}$Li c. $_{12}$Mg d. $_{25}$Mn
2. The ozone layer is found in .....
   a. troposphere. b. stratosphere. c. mesosphere. d. thermosphere.
3. Which of the following elements react with diluted hydrochloric acid ? .....
   a. C b. Cl c. S d. Zn
4. Complete body fossils of insect are found preserved in .....
   a. ammonites. b. amber. c. igneous rocks. d. water.

B Put (✓) or (✗) in front of the following sentences :

1. The atomic size increases in the same group in the modern periodic table by increasing the atomic number. ( )
2. Global warming is a dangerous phenomenon that faces Earth's atmosphere. ( )
3. Sodium is used in manufacturing of electronics. ( )
4. Infrared radiation has a chemical effect. ( )

C Give a reason for :

Although sugar is a covalent compound, it dissolves in water.

Question 4

A Choose from column (B) what suits it in column (A) :

(A)	(B)
1. Archaeopteryx	a. is considered the mid way between horse and zebra.
2. Dobson	b. is an atom of a nonmetallic element which gain electrons.
3. Quagga	c. is a link between reptiles and birds.
4. Negative ion	d. is an atom of metallic element which lose electrons.
	e. is the unit of measuring the degree of ozone.

1. ..... 2. ..... 3. ..... 4. .....

B Correct the underlined words :

1. Meteors burnt in **thermosphere layer**.
2. Both of **K and Mg** don't react with water.
3. Dinosaur's eggs and tooth are examples of **cast fossils**.
4. The element ($_{12}$X) is located in **period (2) and group (3A)** in the modern periodic table.

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C What happens when ... ?

Putting a piece of sodium in water.

18 Kafr El-Sheikh Governorate — Desouk Directorate

Answer the following questions :

Question 1

A Choose the correct answer :

1. ..... is the scientist who discovered the main energy levels in the atom.
   a. Moseley b. Bohr c. Hoffman d. Mendeleev
2. ..... is/are used in extinguishing fires.
   a. Methyl bromide b. Halons c. Nitrogen oxides d. UV radiations
3. Fossils are found in ..... rocks.
   a. sedimentary b. igneous c. metamorphic d. magnetic

B Give an example for :

1. Microfossil.
2. Extinct animal.
3. Metalloid.

C What happens if ... ?

1. Melting the snow of south and north poles of the Earth.
2. Eating fish containing high concentration of lead.

Question 2

A Put (✓) or (✗) in front of the following statements :

1. The atomic size increases in the same group in the modern periodic table by increasing the atomic number. ( )
2. Mixing human and animals wastes with water causes chemical pollution for water. ( )
3. Ferns fossils indicate that the environment was a hot and rainy area. ( )

B Write the scientific term :

1. Safe places established to protect endangered species.
2. The region between troposphere and stratosphere.
3. The ascending order of the elemenat according to their atomic weights.

C Give reasons for :

1. Although sugar is a covalent compound, it dissolves in water.
2. The lower part of the stratosphere is suitable for flying airplanes.

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Question 3

A Complete the following :

1. ..... is a liquid halogen, and ..... is a solid halogen.
2. In group (1A) ..... is the least active element, while ..... is most active one.
3. The most weather phenomena occur in ..... layer, but meteors are formed in ..... layer.

B Cross out the odd word :

1. Dodo bird / Quagga / Mammoth / Bald eagle.
2. Neon / Nitrogen / Argon / Helium.
3. Oxygen / Nitrous oxides / Water vapour / Carbon dioxide.

C Calculate the height of a mountain, if the temperature at its foot is (30°C) and at its top is (-9°C).

Question 4

A Complete these chemical equations :

1. $Mg + 2HCl \xrightarrow{dil.}$ ..... + ...
2. ..... + ... $\longrightarrow H_2CO_3$.
3. $2Na + 2H_2O \longrightarrow$ ..... + ...

B For the element ($^{23}_{11}X$) find :

1. Its period number.
2. Its group number.
3. The block which it belongs to.

C Mention one difference between :

1. Altimeter and aneroid. (according to their uses)
2. Simple ecosystem and complicate ecosystem.

19 Behira Governorate — Science Inspectorate

Answer the following questions :

Question 1

A Complete the following sentences :

1. ..... metal reacts with hot water vapour, while ..... metal doesn't react with water.
2. Water molecules are linked together by ..... bond, due to the higher ..... of oxygen with respect to hydrogen.

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3. ..... is the second atmospheric layer, and it is also called the .....
4. ..... and ..... are examples of remains of an old living organism after death.

B Correct the underlined word :

1. **Chemical pollution** of water causes many diseases such as typhoid and hepatitis.
2. Halogens locate in **s-block** in the modern periodic table.
3. Magnesium reacts with dilute HCl and Cl_2 gas evolves.
4. The number of energy levels occupied by electrons in the atom of an element indicates its **group number**.

C How can you differentiate chemically between magnesium oxide and carbon dioxide ?

(write the balanced chemical equation)

Question 2

A Write the scientific terms for each of the following :

1. Elements of zero group in the modern periodic table.
2. The measuring unit of atomic radius which is used as a measure for the atomic size.
3. A kind of radiations that can be break down oxygen molecule, forming free oxygen atoms.
4. Safe places that are specified to protect the endangered species in their original habitat.

B Mention one example for :

1. Alkali metal.
2. Endangered plant.
3. A fossil of cast.
4. Halogen.

C Calculate the height of a mountain, if the temperature at its foot is 30°C and at its top is (-9°C).

Question 3

A Choose the correct answer :

1. ..... in its salt solution.
   a. Chlorine replaces bromine
   b. Bromine replaces fluorine
   c. Iodine replaces chlorine
   d. Iodine replaces fluorine
2. Increasing the concentration of ..... in drinking water causes blindness.
   a. lead
   b. arsenic
   c. mercury
   d. chlorine

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3. ..... compounds are known commercially as feron.

a. Halons b. Nitrogen oxides c. Halogens d. Chlorofluorocarbons

4. Complete body fossils of insects found preserved in .....

a. ammonite. b. amber. c. igneous rocks. d. carbon dioxide.

B **Choose from column (B) what is suitable in column (A) in the following tables :**

(A)	(B)
1. Altimeter	a. used in the food preservation.
2. Aneroid	b. used to determine today's weather.
3. Liquefied nitrogen	c. used to measure altitude of planes.
4. Cobalt 60	d. used to determine the age of rocks.
	e. used in the preservation of the cornea of the eye

1. ..... 2. ..... 3. ..... 4. .....

C **Give reasons for :**

1. Elements of the same group in the modern periodic table have the same chemical properties.
2. Alkali metals are kept under kerosene in the lab.

Question 4

A **Cross out the odd word, then write the scientific term of the other :**

1. Silver / Sodium / Iron / Calcium.
2. Methyl bromide / Carbon dioxide / Water vapour / Methane gas.
3. Trilobile fossil / Nummulites fossil / Fossil of ferns / Ammonites fossil.
4. Quagga / Dodo bird / Mammoth / Bald eagle.

B **Write the number that indicates each of following :**

1. The normal atmospheric pressure at the sea level.
2. The number of groups in p-block.
3. The boiling point of liquefied nitrogen.
4. The age of whale's fossils in Wadi El-Raiyan.

C **If the volume of gas produced from the electrolysis of water at cathode equals 8 cm^3, Calculate the volume of gas produced at anode and write its name.**

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20 Ismailia Governorate — Science Inspectorate

Answer the following questions :

Question 1

A Complete the following sentences :

1. The coldest layer in the atmosphere is called ..... , while the hottest layer is called .....
2. Biological water pollution causes the infection by many diseases such as ..... , hepatitis and .....
3. From the old extinct animals is ..... , while from the recent extinct animals is .....
4. Fluorine exists in ..... state, while iodine exists in ..... state.

B The following table illustrates the location of some elements in the modern periodic table, fill in the empty spaces :

	Atomic number	Period number	Group number
Cl	17	..... (1)	7A
Ne	..... (2)	2	Zero
Mg	12	..... (3)	..... (4) .....

C Give reasons for the following :

1. In groups of modern periodic table, the atomic size increases by increasing the atomic number.
2. Water is a polar compound.

Question 2

A Choose the correct answer :

1. Fossils are often found in ..... rocks.
   a. metamorphic b. sedimentary c. igneous d. liquid
2. High boiling point of water is due to the presence of ..... bonds between its molecules.
   a. single covalent b. double covalent c. hydrogen d. ionic
3. The normal atmospheric pressure equals ..... mbar at the sea level.
   a. 76 b. 1013.25 c. 1.013 d. 13
4. Alkali metals are considered from ..... block elements.
   a. s b. p c. d d. f

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5. Ras Mohamed protectorate includes .....
   a. rare fish. b. whales' fossils.
   c. rare coral reefs. d. rare fish and coral reefs.
6. When sodium reacts with water, ... gas evolves.
   a. nitrogen b. oxygen c. hydrogen d. carbon dioxide
7. Ozone protects the Earth from harmful effect of ..... rays.
   a. ultraviolet b. infrared
   c. thermal d. infrared and ultraviolet
8. All these alkali metals float on water surface, except .....
   a. K b. Na c. Li d. Cs

B Write the scientific term :

1. Fossils that lived for a short period of time and had a wide geographical range
2. The group in the modern periodic table that its elements react with metals forming salts.
3. The process of replacing the wood material of trees part by part by minerals to form petrified fossils.
4. The radioactive element which is used in food preservation.

C Find the temperature on the top of a mountain, if the temperature at its foot equals 40°C and its height equals 2 km.

Question 3

A Put (✓) or (✗) in front of the following statements :

1. Fern fossils indicate that the environment where they lived was a sea floor. ( )
2. $CO_2 + H_2O \longrightarrow H_2CO_3$ ( )
3. Meteors are formed in mesosphere layer due to friction with air molecules. ( )
4. Mendeleev arranged elements in an ascending order according to their atomic numbers. ( )
5. The transition elements start to appear at the fourth period of the modern periodic table. ( )
6. Ozone layer is found in troposphere layer. ( )
7. Mosley classified the elements of each main group into 2 subgroups A & B. ( )
8. Papyrus is considered as an endangered plant. ( )

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B Cross out the odd word, then write the scientific term for the others :

1. Silicon / Boron / Arsenic / Iodine.
2. Halons / Water vapour / methane gas / CO_2

C Mention the role of the following scientists :

1. Rutherford.
2. Bohr.

Question 4

A Mention an example for each of the following :

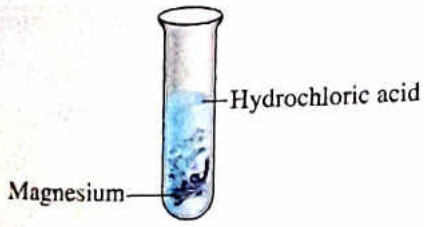
1. Microfossils
2. A layer suitable for flying a plane.
3. A simple ecosystem.
4. A metalloid used in making electronic devices.

B Match from column (B) what suits it in column (A) :

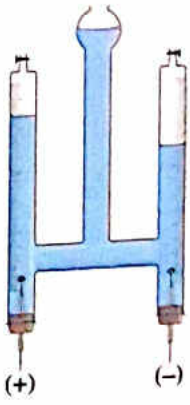
(A)	(B)
1. Sulphur	a. is used to measure atmospheric pressure.
2. Polluted water with mercury	b. reacts with oxygen producing acidic oxide
3. Mammoth	c. causes blindness.
4. Barometer	d. causes death of brain cells.
	e. is a complete body fossil.

1. ..... 2. ..... 3. ..... 4. .....

C Study the following figures, then answer the questions :



1. Write the balanced symbolic equation of the reaction.



2. This device is used for ....., and the volume of the evolved gas above the negative pole equals ..... cm^3 if the volume of other gas equals 10 cm^3.

المعاصر علوم لغات (Notebook) / ٢ع / ترم ١ (م : ٢١)

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21 Port Said Governorate

Port Said Directorate

Answer the following questions :

Question 1

A Replace each of the following statement by a scientific term :

1. The ability of the atom in the covalent molecule to attract the electrons of the chemical bond towards itself.
2. The descending arrangement of metals according to their chemical activity.
3. Brightly coloured light curtains which appear at both north and south poles of the Earth.
4. Traces and remains of the old living organisms that are preserved in sedimentary rocks.

B Join the two pairs :

(A)	(B)
1. Liquefied nitrogen	a. is used in manufacturing of computers.
2. Silicon slide	b. is used in food preservation.
3. Radioactive cobalt 60	c. is used as an insecticide.
4. Liquid sodium	d. is used in the cornea preservation.
	e. is used in transferring heat from the inside of the unclear reactor to its outside.

1. ..... 2. ..... 3. ..... 4. .....

C What happens when ... ?

Putting a piece of sodium in water. (Answer only by using a balanced chemical equation)

Question 2

A Complete the following sentences :

1. Eating fish which contains high ratio of ..... causes the death of the brain cells, while drinking water which contains high ratio of ..... causes infection by liver cancer.
2. Transition elements start to appear at the ..... period and they include ..... groups.
3. All atmospheric phenomena occur in the ..... layer of the atmosphere, while ..... is the layer where satellites float around the Earth.
4. Fossils can be used in ..... exploration and to determine the age of .....

B Put (✓) or (✗) opposite to each of the following statements :

1. The atomic size of the elements of the same group in the modern periodic table, increases by the increase of elements atomic numbers. ( )

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2. The modern periodic table consists of 9 horizontal periods and 13 vertical groups. ( )
3. Archaeopteryx fossil links between reptiles and mammals. ( )
4. Quagga is a recent extinct animal. ( )

C Mention the importance or the use of :

1. Altimeter.
2. Halons.

Question 3

A Choose the correct answer :

1. ..... is considered as one of the halogens .
   a. Sodium b. Calcium c. Helium d. Chlorine
2. There are ..... bonds between water molecules.
   a. covalent b. ionic c. hydrogen d. ionic and covalent
3. Meteors are formed in the ..... layer of the atmosphere.
   a. ionosphere b. tropopause c. mesosphere d. stratopause
4. One of the examples of a complete body fossil is the .....
   a. dinosaur tooth. b. mammoth.
   c. ammonite. d. coral.

B Mention the name of the scientist who :

1. Discovered that the nucleus of an atom contains positively charged protons.
2. Discovered the main energy levels in the atom.
3. Postulated that the thickness of the ozone layer is 3 mm only under normal atmospheric pressure at 0°C.
4. Discovered that the periodicity of elements properties is related to their atomic number, not to their atomic weights.

C Compare between :

Acidic oxides and basic oxides (in terms of solubility in water).

Question 4

A Cross out the odd word and explain how other words are related.

1. Boron / Silicon / Sodium / Germanium.
2. Methyl bromide / Carbon dioxide / Water vapour / Methane gas.
3. Panda bear / Rhinoceros / Dodo bird / Bald eagle.
4. Mould / Angiosperms / Cast / Complete body fossil.

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B **Correct the underlined words :**

1. Elements of the **s-block** include 6 groups in the modern periodic table.
2. **Stratosphere** is the hottest layer of the atmosphere.
3. The atmospheric pressure is measured in a unit called the **meter**.
4. Complete fossils of insects are found preserved in **ammonite**.

C **During electrolysis of water, a gas evolves that burns with a pop sound. Name this gas and name the apparatus used in the electrolysis process.**

22 Minia Governorate — Minia Official Language School

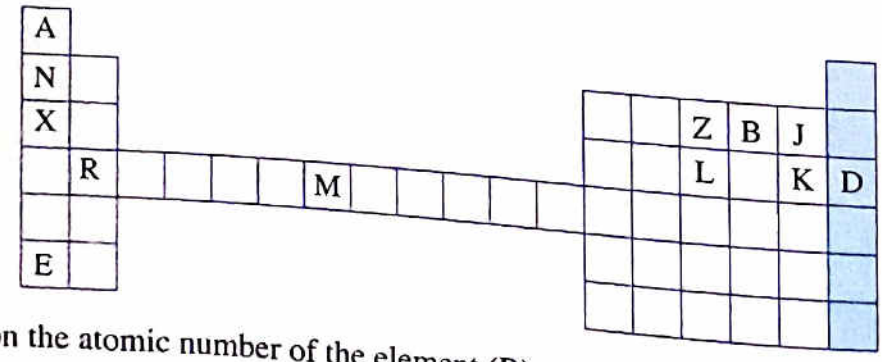
Answer the following questions :

Question 1

A **Complete the following sentences :**

1. ..... + ... $\xrightarrow{\text{Dilute}}$ $MgCl_2 + H_2\uparrow$
2. The modern number of group zero is ..... , while that of group (5A) is .....
3. There is ..... fossils in the ..... rocks of El-Mokattam's mountain.
4. The height of the atmospheric envelope from the sea level equals ..... , while the normal atmospheric pressure equals ..... millibar.

B **Study the following figure which represents a section of the modern periodic table, then answer :**



1. Mention the atomic number of the element (B).
2. What do shaded area represent ?
3. Mention the symbol which represents :
   a. The most active element in group (1A).
   b. The element which has the largest atomic size in the second period.

C **Explain the behaviour of the following element when react with water :**

1. Iron.
2. Silver.

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Question 2

A Choose the correct answer :

1. There are ..... bonds among water molecules.

   a. ionic b. hydrogen c. covalent

2. The scientist who left gaps in his table to be filled with suitable discovered elements in the future is .....

   a. Moseley. b. Bhor. c. Mendeleev.

3. All the following are endangered species, except .....

   a. panda bear. b. quagga. c. rhinoceros.

4. An element $_{17}X$ is similar to ..... in its chemical properties.

   a. $_{2}A$ b. $_{19}Z$ c. $_{9}L$

B Mention one example for :

1. A solid halogen.
2. Endangered plant.
3. A polar compound.
4. Microfossil.

C Give two negative effects for global warming phenomenon.

Question 3

A Write the scientific term for each of the following :

1. Two magnetic belts help in scattering the harmful cosmic radiation away from the Earth.
2. The ability of the atom to attract the bond electrons to itself in the covalent compound.
3. A liquid metal acts as a heat conductor in the nuclear reactors for generating electricity.
4. Elements which start to appear in the fourth period of the modern periodic table.

B Correct the underlined words :

1. Basic oxides dissolve in water forming **acids**.
2. The charged ions that extends about 700 km above the sea level is known as the **troposphere**.
3. Eating food containing high concentration of **mercury** causes death of the brain cells.
4. **Isotopes** are curved lines that join the points of equal pressure in the atmospheric pressure maps.

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C **Give reasons for :**

The atomic size of elements in the same period decreases as their atomic number increases.

Question 4

A **Mention each of the following :**

1. Measuring unit of the atomic size of elements.
2. A pollutant of ozone layer.
3. A simple ecosystem.
4. A link between reptiles and birds.

B **Mention the name the scientist or the organism that is indicated by each of the following :**

1. Discovered that the atom has 7 energy levels.
2. Postulated that the thickness of ozone layer is 3 mm at STP.
3. Discovered the positive protons inside the nucleus.
4. Organisms that are being protected in Ras Mohamed protectorate.

C **What is the scientific principle of elements classification in the modern periodic table ?**

23 Sohag Governorate — El-Manahel Private Language School

Answer the following questions :

Question 1

A **Complete the following sentences with suitable words :**

1. Elements of ..... block are located on the left side of the modern periodic table, while the elements of ..... block are located in the middle.
2. Sodium oxide is from ..... oxides, while carbon dioxide is from ..... oxides.
3. Halogens are ....., and form ..... ions during chemical reactions.
4. The mold carries the ..... details of the structure of the living organism, while the cast carries the ..... details of the structure of the living organism.
5. ..... and ..... are from extinct species at the old geological ages.

B **Give reasons for :**

1. The desert is affected by the absence of one of its species.
2. Abnormal properties of water.

C **If the temperature was 10°C at the height of 3 km. calculate the temperature at the sea level.**

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Question 2

A Choose the correct answer :

1. ..... is the scientist who arranged the elements in ascending order according to their atomic numbers.
   a. Rutherford b. Moseley c. Mendeleev d. Bohr
2. The difference in electronegativity between the elements of a polar compound is .....
   a. very high. b. relatively low. c. zero. d. relatively high
3. The high ratio of ..... in drinking water leads to blindness.
   a. chlorine b. mercury c. lead d. arsenic
4. The planes fly in the lower part of .....
   a. troposphere. b. stratosphere. c. mesosphere. d. thermosphere.
5. ..... protectorate is the first established natural protectorate in Egypt.
   a. Saint Catherin b. Ras-Mohamed c. Wadi El-Hetan d. Petrified forest
6. Archaeopteryx is a connection between ..... and .....
   a. fish and amphibians. b. reptiles and birds.
   c. birds and mammals. d. amphibians and reptiles.

B Mention the use of each of the following :

1. Radioactive cobalt 60.
2. Halons.
3. Van-Allen Belts.
4. Hofmann's voltameter.

C Compare between :

1. Ferns fossil and dinosaur's egg fossil (concerning the type of fossils).
2. Infrared rays and ultraviolet rays (concerning their effect).

Question 3

A Write the scientific term :

1. A type of water pollution resulted from dumping atomic wastes in oceans and seas.
2. The weight of an air column of atmospheric height on a unit area.
3. The solidified resinous matter which was secreted by pine trees in old geological ages.
4. Elements that have the properties of metals and nonmetals.
5. The continuous decrease in the number of a certain species of living organisms, without compensation until they all die out.
6. An atmospheric layer contains limited quantities of helium and hydrogen gases only.

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B What happens when ... ?

1. The continuous increase in the percentage of carbon dioxide gas.
2. Mendeelv predicted the discovery of new elements.

C Write the balanced chemical equations which express the following reactions :

1. Burning of magnesium in oxygen.
2. Sodium with water.

Question 4

A Put (✓) or (✗) in front of the following sentences :

1. The modern periodic table consists of 18 horizontal periods and 7 vertical columns. ( )
2. Metals don't react with acids. ( )
3. The atomic size decrease in the same group in the modern periodic table by increasing the atomic number. ( )
4. Mixing human and animals wastes with water is considered as a biological pollution. ( )
5. The upper part of the thermosphere is called the ionosphere. ( )
6. Panda bear is from endangered species. ( )

B What is meant by ... ?

1. Aurora phenomenon.
2. Chemical activity series.

C Locate the follwoing elements in the modern periodic table :

1. Fluorine ($_9$F).
2. Argon ($_{18}$Ar).

24 Luxor Governorate — Arment Directorate

Answer the following questions :

Question 1

A Complete the following statements :

1. Archoepteryx fossil represents the link between ..... and .....
2. Modern periodic table consists of ..... horizontal periods and ..... groups.
3. Elements of group (1A) are called alkali metals as their elements react with ..... forming .....
4. The infrared rays have ..... effect, while ..... rays have chemical effect.

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B What happens if ... ?

1. A metal atom losses one electron or more during the chemical reaction.
2. An organism is buried fast after death in snow.
3. Mixing of water with animal and human wastes.
4. Erosion of ozone layer over an area.

C Locate the following elements in the modern periodic table :

1. $_{18}Ar$ 2. $_{20}Ca$

Question 2

A Write the scientific term :

1. The continuous decrease without compensation in the number of a certain speices until all members die out.
2. Charged layer which reflects radio waves.
3. Elements that starting to appear from period number four in the modern periodic table.
4. Appearance of bright colored light curtains at both poles of the Earth.

B Cross out the odd word :

1. Dodo bird / Bald eagle / Ibis bird / Rhinoceros.
2. Helium / Cesium / Xenon / Radon.
3. Sodium / Silver / Potassium / Cesium.
4. Oxygen / Nitrous oxide / Water vapor / Carbon dioxide.

C Compare between :

Mold and cast (according to definition).

Question 3

A Choose the correct answer :

1. ..... is the coldest layer of the atmospheric envelope.
   a. Ionosphere b. Mesosphere c. Stratosphere d. Troposphere
2. Eating fish containing high concentration of ..... causes death of the brain cells.
   a. arsenic b. lead c. cobalt 60 d. mercury
3. The scientist ..... had discovered the main energy levels.
   a. Moseley b. Bohr c. Mendeleev d. Rutherford
4. The ..... replaces the wood material part by part of an old tree.
   a. copper b. minerals c. lead d. iron

B Give reasons for each of the following :

1. Pilots prefer to fly their planes in the lower part of the stratosphere.
2. Halogens are monovalent.
3. Formation of petrified woods fossils.
4. potassium is more active than sodium.

C Problem :

Calculate the height of a mountain, if the temperature at its foot is 30°C and at its top is –6°C.

Question 4

A Correct the underlined words :

1. Meteors burnt in the **stratosphere**.
2. Pure water has **alkaline** effect on litmus paper.
3. Slides of **copper** are used in making computer sets.
4. Magnesium oxide is **an acidic oxide**.

B Put (✓) or (✗) :

1. Wavelength of near ultraviolet radiation is 280 : 315 nanometer. ( )
2. Tropical forest is an example of complicated ecosystem. ( )
3. Chlorine can replace bromine in its salt. ( )
4. Quagga is an example of extincted animal in old geological ages. ( )

C Write the balanced chemical equation for :

1. Burning of magnesium ribbon in air.
2. Reaction of sodium with water.

25 Aswan Governorate — M.M Yacoub Formal Language School

Answer the following questions :

Question 1

A Choose the correct answer :

1. All are greenhouse gases, except .....
   a. CO_2 b. O_2 c. N_2O d. CH_4
2. Sodium oxide from ..... oxides.
   a. amphoteric b. acidic c. nonmetallic d. basic

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3. ..... is and example of microfossils.

a. Mammoth b. Ferns c. Foraminifera d. Archaeopteryx

4. There are ..... bonds between the water molecules.

a. hydrogen b. covalent c. ionic d. metallic

B What is meant by ... ?

1. Metalloids. 2. Fossil.

C What is the importance of ... ?

1. Silicon. 2. Cobalt 60.

Question 2

A Write the scientific term for each of the following statements :

1. The boundary separating between stratosphere and mesosphere where temperature is rather constant.
2. Replacing part by part the wood material of trees by minerals to form petrified woods.
3. Continuous increase of the average temperature of the air near the surface of the Earth.
4. A type of ultraviolet radiation that is absorbed completely (100 %) in the ozone layer.

B Compare between :

1. Mold and cast. (Regarding to the definition)
2. Mesopsphere and thermosphere. (Regarding to the importance)

C Write the balanced chemical equations which express the reaction of :

1. Carbon dioxide with water.
2. Magnesium with dil. hydrochloric acid.

Question 3

A Locate the following elements in the modern periodic table :

1. $_{11}Na$ 2. $_{20}Ca$ 3. $_{13}Al$ 4. $_{18}Ar$

B Give reasons for :

1. Alkali metals are kept under the surface of kerosene in the lab.
2. The lower part of the stratosphere is suitable for flying airplanes.

C Cross out the odd word and mention the relation between the others :

1. Dodo bird / Quagga / Bald eagle / Mammoth.
2. Panda bear / Rhinoceros / Quagga / Bald eagle.

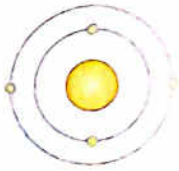
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Question 4

A Complete the following statement :

1. The modern periodic table consists of ..... horizontal periods, ... vertical groups.
2. Ultraviolet radiation has a ..... effect, and the infrared radiation has a ..... effect.
3. Fossil are used in ..... exploration and determining the age of .....
4. The scientist Mendeleev arranged the elements ascendingly according to ..... , while the scientist Moseley arranged them ascendingly according to .....

B Study the opposite figure which explains the electronic configuration for an element in the modern periodic, then conclude the atomic number of the element which follows this element in :



1. The same period.
2. The same group.

C Problem :

Calculate the height of a mountain, if the temperature at its foot is 30°C and at its top is – 6°C.

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SCIENCE

GUIDE ANSWERS 2023

FIRST TERM

BY A GROUP OF SUPERVISORS



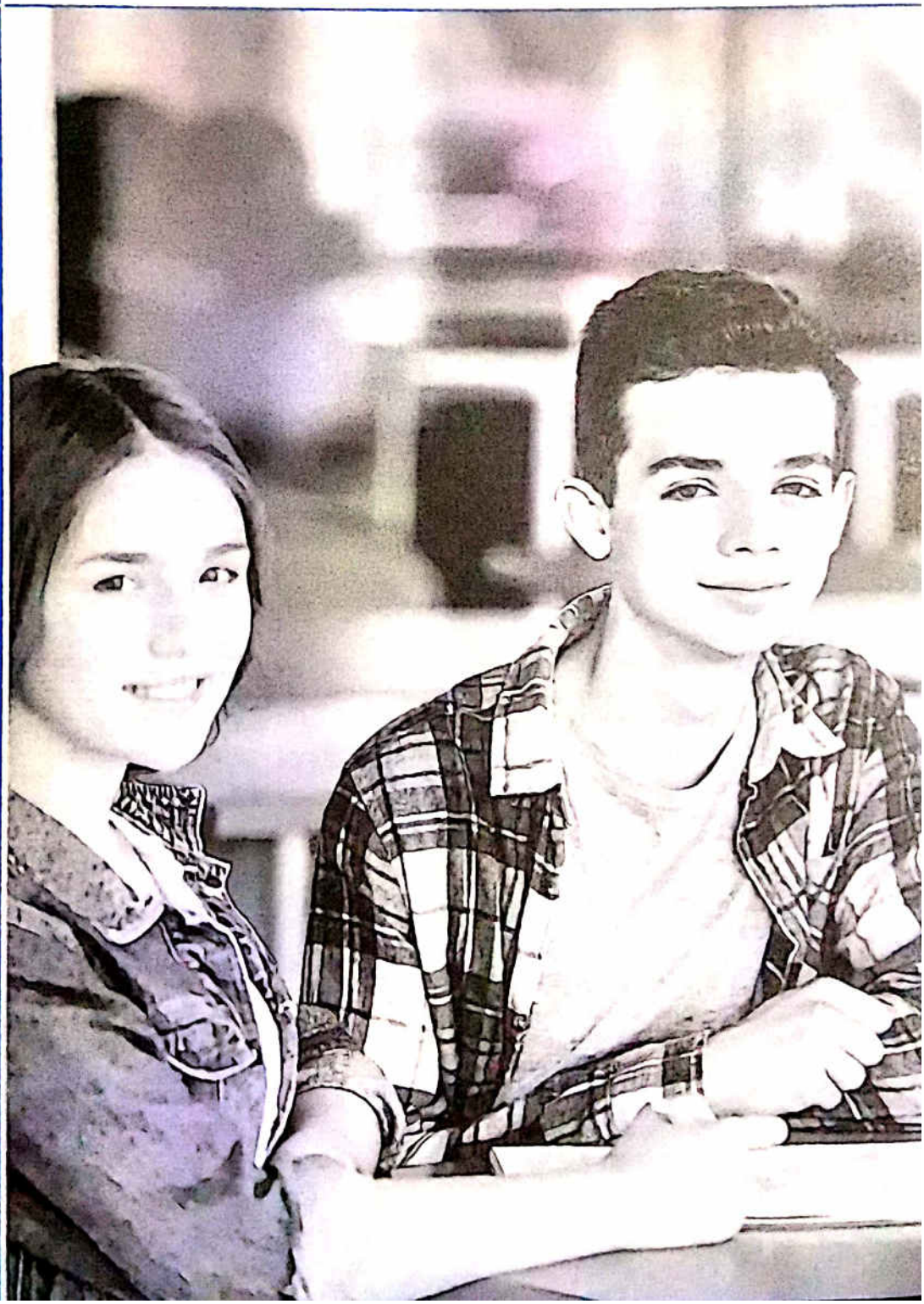
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PART 1

Guide Answers of
The Main Book



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Unit One

Lesson 1

1

1. d	2. d	3. a	4. d	5. c	6. b
7. b	8. b	9. c	10. a	11. d	12. b
13. a	14. c	15. a	16. d	17. d	18. d
19. d	20. c	21. a	22. b	23. a	24. d
25. a	26. b	27. c	28. c	29. b	30. b

2

1. c 2. d 3. a 4. b

3

1. c.B 2. d.A 3. a.E 4. b.D

4

1. (✓)
2. (✗) Mendeleev's periodic table is .....
3. (✗) ..... put in vertical groups.
4. (✗) ..... 67 elements.
5. (✗) ..... new period.
6. (✗) ..... ascendingly .....
7. (✓)
8. (✗) Mendeleev .....
9. (✗) ..... is 118 elements.
10. (✓)
11. (✗) ..... into 4 blocks.
12. (✓)
13. (✗) ..... on the right side .....
14. (✓)
15. (✗) ..... 6 groups.
16. (✗) ..... by (B).
17. (✗) Elements of groups (B) .....
18. (✗) ..... its period number.
19. (✗) The group number of .....
20. (✓)
21. (✗) ..... is 12
22. (✓)
23. (✗) ..... same period .....
24. (✓)

5

1. Mendeleev's periodic table.
2. Moseley's periodic table.
3. Protons.
4. Modern periodic table.
5. Groups.
6. Periods.
7. Main energy levels.
8. Transition elements.
9. p-block.
10. Inert (noble) gases.
11. f-block.
12. Period number.
13. Group number.
14. Atomic number.

6

1. Mendeleev – Moseley – modern
2. left – right – periods.
3. atomic weights
4. atomic weights – atomic numbers.
5. X – atomic numbers – atomic weights.
6. one electron – period.
7. protons.
8. lanthanides – actinides
9. Bohr – 7
10. sublevels.
11. their atomic numbers – way of filling their energy sublevels with electrons.
12. 118 – 92 – artificially.
13. 7 – 18
14. left – 1A – 2A
15. right – six
16. 16 – 6
17. B – 8 – three
18. transition
19. 4 – 10
20. 18 – 15
21. left – right
22. period – group
23. 2 – 5A
24. 11
25. 3 – 3A
26. second – 1A
27. zero – 2
28. 12
29. group – period

7 ①

Element	Its atomic number	Its electronic configuration			Its position in periodic table	
		K	L	M	Period No.	Group No.
$_{6}C$	6	2	4	–	2	(4A)
$_{8}O$	8	2	6	–	2	(6A)
$_{12}Mg$	12	2	8	2	3	(2A)
$_{17}Cl$	17	2	8	7	3	(7A)

②

Element	$_{20}Ca$	$_{15}P$	$_{10}Ne$	$_{1}H$
Electronic configuration :	K L M N 2 8 8 2	K L M 2 8 5	K L 2 8	K 1
No. of energy levels :	4	3	2	1
Period number :	4	3	2	1
No. of electrons in the outermost level :	2	5	8	1
Group number :	2 A	5A	0	1A

8

1. Mendeleev.
2. Rutherford.
3. & 4. Moseley.
5. Bohr.

9

1. To facilitate their study and find a relationship between elements and their physical and chemical properties.
2. Because he predicted the discovery of new elements and determined the values of their atomic weights.
3. To put the elements in groups that suit their properties.
4. Due to the similarity in their properties.
5. Due to the difference between the properties of their elements.
6. Because their atoms have the same number of electrons in the outermost energy level.

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7. Because their outermost energy level contains the same number of electrons (one electron).
8. Because their atoms have the same number of energy levels occupied by electrons (2 levels).
9. Because the atomic number of an element is an integer and it increases in the same period from an element to the following element by one electron.

10

	Period	Group
1.	1	1A
2.	2	5A
3.	2	4A
4.	2	0
5.	3	2A
6.	3	7A
7.	3	0
8.	4	2A
9.	2	6A
10.	4	1A
11.	3	6A
12.	2	3A
13.	3	5A
14.	3	1A
15.	3	3A

11 1. 1 2. 2 3. 12 4. 17 5. 18 6. 5

12

Odd symbol	Scientific term
1. F	Symbols of some main energy levels.
2. k	Symbols of blocks of the modern periodic table and also symbols of energy sublevels.
3. $_{12}Mg$	Symbols of some elements of group (1A).
4. $_{12}Mg$	Symbols of some noble gases.
5. $_{13}Al$	Symbols of some elements of second period.

13 1. 67 2. 7 3. 118 4. 92
5. 4 6. 2 7. 6 8. 10

14 1. *Look at the main book on page (16).*
2.

Points of comparison	p-block	d-block
The location in the modern periodic table :	On the right side of the periodic table.	In the middle of the periodic table.
No. of groups of elements :	6	10

3.

Points of comparison	s-block	p-block
The location in the modern periodic table :	On the left side of the periodic table.	On the right side of the periodic table.
No. of groups of elements :	2	6

4.

Points of comparison	$_{11}Na$	$_{17}Cl$
Electronic configuration :	2 , 8 , 1	2 , 8 , 7
Period no.	3	3
Group no.	1A	7A
The block symbol :	s-block	p-block

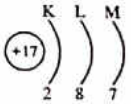
15

① *Look at the main book on page (25).*

② 1. An ascending order according to their atomic weights.
2. An ascending order according to their atomic numbers.

③ An ascending order according to their atomic numbers and the way of filling their energy sublevels with electrons.

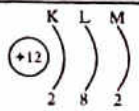
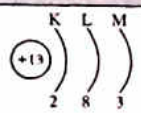
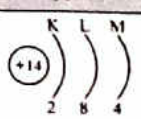
④ *Look at the main book on pages (13 & 14).*

⑤ 1. 

2. 7A 3. 3

⑥ 1. Group 2A (2), because the number of electrons in the outermost energy level in the atom of each of them equals 2 electrons.
2. s-block, because their elements belong to group 2A (2).
3. $_{12}X$, because it has 3 energy levels occupied by electrons.

⑦

	$(_{12}X)$	$(_{13}Y)$	$(_{14}Z)$
1			
2	Period (3) and group (2A).	Period (3) and group (3A).	Period (3) and group (4A).
3	s-block.	p-block.	p-block.

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⑧ 1. (a). 11 (b). 11 + 12 = 23
2. (a). s-block (b). 1A

16

① The periodic table is Mendeleev's periodic table. Because the numbers present in it are atomic weights not atomic numbers (which are integer numbers).

② 1. Period (3).
Because the electrons of atoms of these elements orbit in 3 energy levels.
2. (a). 2A (2).
(b). 6A (16).
(c). Zero (18).
3. No, it does not contain element from d-block. Because elements of d-block start to appear from period number (4).
4. (a). Na and Mg
(b). Al , Si , P , S , Cl and Ar.

③ 1. Period (2).
2. 2A (2).
3. ∵ Element (A) locates in the second period and group (1A).
∴ The atomic number of the element which follows it in the same group (1A), and locates in third period = 2 + 8 + 1 = 11
4. p-block.
5. Inert gas – monovalent.

④ 1. X is s-block.
Y is d-block.
Z is p-block.
2. X consists of 2 groups.
Y consists of 10 groups.
Z consists of 6 groups.
3. Zero group is (18) and group (7A) is (17).

⑤ ∵ The atomic number of element (X) = 2 + 2 = 4 and it has 2 energy levels.
∴ The atomic number of the element that follows element (X)
1. In the same period = 4 + 1 = 5
2. In the same group = 2 + 8 + 2 = 12

⑥ 1. In period 2 and group (6A).
2. p-block. 3. b

⑦ 1. (a) B (b) M
(c) X (d) Z and A
(e) p
2. (a) d (b) c (c) c
3. 16

⑧ 1. ∵ Element (A) precedes element (B) in the same group.
∴ Element (A) is located in period (2) and zero group.
∴ Atomic number of element (A) = 2 + 8 = 10
2. electrons in the outermost energy level (8 electrons).

⑨ Graph (C).

17 **Answer by yourself.**

Thinking Skills Questions

① 1. 3 2. 14 – 16 3. 1 – 11

② 1. b 2. a 3. b 4. b

③ Because each period starts by filling of new energy level and the number of main energy levels in the heaviest known atoms is 7 till now.

④ a. 12 b. 18

⑤ a. ∵ Element (X) forms with oxygen a compound, its formula is X_2O
∴ The valency of element (X) is monovalent.
∴ The number of electrons in the outermost energy level of its atom = 1 electron.
∴ Element (X) locates in group 1A (1).

b. ∵ The element locates in the third period.
∴ The number of energy levels occupied by electrons in its atom = 3 energy levels.
∴ The atomic number = 2 + 8 + 1 = 11

c. s-block.

Lesson 2

1

1. d	2. b	3. a	4. a	5. c	6. b
7. c	8. d	9. b	10. d	11. d	12. a
13. d	14. a	15. d	16. b	17. c	18. b
19. c	20. d	21. b	22. d	23. b	24. d

2

1. (✓)
2. (✗) ..... is smaller than .....
3. (✓)
4. (✗) ..... between the two bonded elements is relatively high.
5. (✓)
6. (✗) ..... is relatively high.

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7. (✗) ..... nearest preceding inert gas.
8. (✗) ..... and a neon atom (Ne) .....
9. (✗) ..... carries two positive charges.
10. (✗) ..... a strong metal.
11. (✓)
12. (✗) ..... the metallic property decreases.
13. (✓)
14. (✗) ..... and (H_2) gas evolves.
15. (✓)
16. (✗) ..... in a descending order .....
17. (✗) Carbonic acid is .....
18. (✓)
19. (✗) Copper and silver .....
20. (✗) ..... forming alkaline solutions.
21. (✗) ..... gives (CO_2) gas .....
22. (✓)
23. (✗) Some bases ..... forming alkalis.

3

1. Picometre.
2. Electronegativity.
3. Polar compounds.
4. Water.
5. Metals.
6. Positive ion.
7. Nonmetals.
8. Negative ion.
9. Neon gas.
10. Metalloids.
11. Group (7A).
12. Litmus solution.
13. Basic oxides.
14. Alkalis.
15. Amphoteric oxides.
16. Chemical activity series.
17. Acids.
18. Acidic oxides.

4

1. atomic radius – picometre.
2. decrease
3. increases – energy levels.
4. greater – smaller
5. Electronegativity – electrons
6. Water – ammonia
7. more – electronegativity – greater
8. metalloids – noble gases.
9. less – more
10. gain – negative ion.
11. two – positive – two
12. positive – positive charges
13. negative – electrons.
14. Metalloids
15. decreases – increases.
16. a strong metallic element – a noble gas.
17. cesium.
18. increases.
19. salts of acids – hydrogen
20. alkaline solutions – blue.
21. descending – chemical activity
22. Iron – copper
23. Carbon
24. basic – acidic
25. acidic solutions – red.

5

1. $2Mg + O_2 \xrightarrow{\Delta} 2MgO$
2. $MgO + H_2O \longrightarrow Mg(OH)_2$
3. $Mg + 2HCl \xrightarrow{dil.} MgCl_2 + H_2\uparrow$
4. $C + O_2 \xrightarrow{\Delta} CO_2$
5. $CO_2 + H_2O \longrightarrow H_2CO_3$

6

Element	Its electronic configuration	Its kind	Formula of its oxide	Type of its oxide
1. $_{11}Na$	K L M (+11) 2 8 1	Metal	Na_2O	Basic oxide
2. $_{12}Mg$	K L M (+12) 2 8 2	Metal	MgO	Basic oxide
3. $_{6}C$	K L (+6) 2 4	Nonmetal	CO_2	Acidic oxide

7

1. Due to the increase of the attraction force between the positive nucleus and the negative electrons in the outermost energy level.
2. Because by increasing the atomic number in the same group, the number of energy levels occupied by electrons increases.
3. Because the difference in electronegativity between its elements is relatively high.
4. Because the difference in electronegativity between oxygen and hydrogen in water molecule is greater than the difference between nitrogen and hydrogen in ammonia molecule.
5. Because the difference in electronegativity between its elements is relatively high.
6. Because ($_{11}Na$) is a metal element, so it tends to lose its outermost electron and changes into a positive ion (Na^+).
7. Because ($_{17}Cl$) is a nonmetal element, so it tends to gain one electron and changes into a negative ion (Cl^-).

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8. Because during chemical reaction, sodium atom ($_{11}Na$) loses one electron and fluorine atom ($_{9}F$) gains one electron so, the number of electrons becomes 10 electrons in each of the two ions.
9. Due to increasing their atomic sizes, so the ability to lose the outermost electron increases.
10. Because it has the largest atomic size, so it can lose its valency electron easily.
11. Because magnesium oxide is a basic oxide which dissolves in water forming magnesium hydroxide (alkaline solution) which turns litmus solution into blue.
$MgO + H_2O \longrightarrow Mg(OH)_2$
12. Because potassium is a very active metal, while copper is inactive metal according to their chemical activity.
13. Because carbon dioxide is an acidic oxide which dissolves in water forming carbonic acid (acidic solution) which turns litmus solution into red.
$CO_2 + H_2O \longrightarrow H_2CO_3$
14. Because it reacts with acids as a basic oxide and it reacts with bases as an acidic oxide giving in the two cases salt and water.

8

1. It is the ability of the atom in a covalent molecule to attract the electrons of the chemical bond towards itself.
2. They are covalent compounds in which the difference in electronegativity between their elements is relatively high.
3. They are the elements which have less than four electrons in their outermost energy levels.
4. They are the elements which have more than four electrons in their outermost energy levels.
5. An atom of a metallic element which lost one electron or more during the chemical reaction.
6. An atom of a nonmetallic element which gained one electron or more during the chemical reaction.
7. They are the elements which have the properties of both metals and nonmetals.
8. It is the arrangement of metals in a descending order according to the degree of their chemical activities.
9. They are metallic oxides, some of them dissolve in water forming alkaline solutions.
10. They are nonmetallic oxides which dissolve in water forming acidic solutions.

9

1. $Mg + 2HCl \xrightarrow{dil.} MgCl_2 + H_2\uparrow$
2. $2Mg + O_2 \xrightarrow{\Delta} 2MgO$
3. $MgO + H_2O \longrightarrow Mg(OH)_2$
4. $C + O_2 \xrightarrow{\Delta} CO_2$
5. $CO_2 + H_2O \longrightarrow H_2CO_3$

10

1. $_{13}Al < _{12}Mg < _{11}Na < _{19}K$
2. $_{3}Li < _{11}Na < _{19}K < _{55}Cs$
3. $Cu < Zn < Mg < K$

11

1. - By adding water to each of them.
   - With sodium: It reacts instantly with water and hydrogen gas evolves which burns with a pop sound.
   - With iron: It reacts at high temperatures with hot water vapour only.
2. - By adding water and drops of violet litmus solution :
   - With magnesium oxide, litmus solution turns into blue.
   - With sulphur oxide, litmus solution turns into red.

12

Odd word (or symbol)	Scientific term of others
1. Cl^-	Their electronic configuration is similar to that of neon.
2. Bromine	Metalloids.
3. Silver	Elements react with water.
4. CO_2	Basic oxides.

13

1. The atomic size increases.
2. It changes into a positive ion.
3. It changes into a negative ion.
4. The atomic number increases then the atomic size increases, so the metallic property increases and the nonmetallic property decreases.
5. Magnesium chloride is formed and hydrogen gas evolves.
$Mg + 2HCl \xrightarrow{dil.} MgCl_2 + H_2\uparrow$
6. It burns with a bright light and changes into powder (magnesium oxide).
$2Mg + O_2 \xrightarrow{\Delta} 2MgO$
7. It dissolves in water forming magnesium hydroxide.
$MgO + H_2O \longrightarrow Mg(OH)_2$

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8. Carbon dioxide gas is formed.

$$C + O_2 \xrightarrow{\Delta} CO_2$$

9. The solution turns into blue.
10. The solution turns into red.
11. It dissolves forming carbonic acid solution.

$$CO_2 + H_2O \longrightarrow H_2CO_3$$

14 1.

Period elements	Group elements
- They are different in properties.	- They are similar in properties.
- They are similar in the number of energy levels occupied by electrons.	- They are similar in the number of electrons in the outermost energy level.
- They are different in the number of electrons in the outermost energy level.	- They are different in the number of energy levels occupied by electrons.
By increasing their atomic numbers : • Atomic size decreases. • Metallic property decreases till we reach metalloid, then nonmetallic property increases and ends with an inert gas.	**By increasing their atomic numbers :** • Atomic size increases. • Metallic property increases "in groups which start with a metallic element".

2. ***Look at the main book on page (46).***
3. ***Look at the main book on page (55).***
4. ***Look at the main book on page (55).***
5.

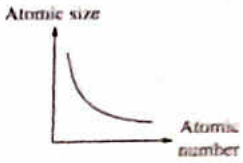
P.O.C.	Sodium	Silver
The reaction with water :	It reacts instantly with water and hydrogen gas evolves which burns with a pop sound.	It doesn't react with water.

6.

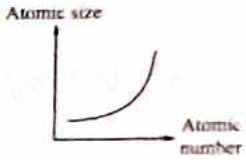
P.O.C.	Magnesium oxide	Carbon dioxide
• **Type of oxide :**	Basic oxide	Acidic oxide
• **The reaction with water :**	It dissolves in water forming magnesium hydroxide (alkaline solution) which turns litmus solution into blue. $MgO + H_2O \longrightarrow Mg(OH)_2$	It dissolves in water forming carbonic acid (acidic solution) which turns litmus solution into red. $CO_2 + H_2O \longrightarrow H_2CO_3$

15 1. Iron reacts at high temperatures with hot water vapour only.
2. Silver doesn't react with water.
3. Potassium reacts instantly with water and hydrogen gas evolves which burns with a pop sound.

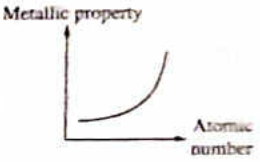
16 1. Inverse relation.



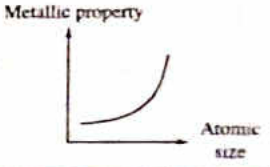
2. Direct relation.



3. Direct relation.



4. Direct relation.



17 ① 1. * The name of (A) is magnesium oxide and its chemical formula is MgO
* The name of (B) is magnesium hydroxide and its chemical formula is $Mg(OH)_2$
2. It turns the litmus solution into blue.
3. Basic oxide.

② 1. $_{11}X$ 2. $_{12}Z$ 3. $_{12}Z$

③ 1. $_{9}Y$ 2. $_{11}Z$

④ 1. ($_{11}$Na) and ($_{13}$Al) belong to period (3) but ($_{6}$C) belongs to period (2).
2. ($_{11}$Na) locates in group (1A).
($_{13}$Al) locates in group (3A).
($_{6}$C) locates in group (4A).
3. * Sodium oxide is a basic oxide.
* Aluminium oxide is an amphoteric oxide.
* Carbon dioxide is an acidic oxide.
4. a. Sodium oxide forms an alkaline solution.
b. Carbon dioxide forms an acidic solution.

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⑤ 1. $MgO + H_2O \longrightarrow Mg(OH)_2$
Alkaline solution

2. $Mg + 2HCl \xrightarrow{Dil.} MgCl_2 + H_2\uparrow$
Metal chloride

⑥ *Look at the main book on page (53).*

10 ① 1. Fig. (C) 2. Fig. (B) 3. Fig. (A)

② 1. $_{19}K$ 2. $_{8}O$

③ 1. Hydrogen gas, by approaching a burning match to it, it burns with a pop sound.

2. $Mg + 2HCl \xrightarrow{Dil.} MgCl_2 + H_2\uparrow$

④ Fig. (C)

Thinking Skills Questions

① 1. d 2. c 3. d 4. d

② $_{19}K > _{20}Ca > _{12}Mg > _{14}Si > _{8}O > _{9}F$

③ a. 11– s-block.

b. Period (3) and group (1A).

c. Neon. d. Basic oxide.

④ a. 6

b. Acidic oxide, because element (X) is a nonmetal, its oxide dissolves in water forming an acidic solution.

⑤ a. Divalent – 12

b. Basic oxide – s-block.

c. It turns into blue.

⑥ a. 16 b. 8

⑦ a. - Blue litmus paper changes into red, because CO_2 gas dissolves in water forming carbonic acid.

- Red litmus paper doesn't change.

b. $CO_2 + H_2O \longrightarrow H_2CO_3$

Lesson 3

1

1. b	2. a	3. c	4. b	5. a
6. c	7. b	8. c	9. a	10. d
11. d	12. b	13. d	14. c	15. c
16. b	17. b	18. b	19. c	20. a
21. b	22. a	23. b	24. b	25. c
26. a	27. b	28. a	29. c	30. c
31. d				

2

1. (✗) ..... one positive charge.
2. (✗) Sodium and potassium.....
3. (✗) Cesium is the .....
4. (✓) 5. (✓)
6. (✓) 8. (✓)
7. (✓)
9. (✗) ....., while iodine exists in a solid state.
10. (✓)
11. (✗) ..... with potassium iodide.
12. (✗) Elements of group (17) .....
13. (✗) ..... p-block groups.
14. (✗) Cobalt 60 is .....
15. (✓) 16. (✗) Liquefied nitrogen .....
17. (✗) Silicon slides .....

3

1. Group (1A).	2. Alkali metals.
3. Positive ions.	4. Cesium.
5. Group 7A (17).	6. Halogens.
7. Iodine.	8. Bromine.
9. Sodium.	10. Cobalt 60
11. Silicon.	12. Liquefied nitrogen.

4

1. alkali metals – s 2. the left side
3. Sodium – potassium 4. water – alkaline
5. monovalent.
6. valency – positive – one
7. active – kerosene – paraffin oil.
8. kerosene – moist air.
9. atomic number – atomic size
10. Cesium – atomic size. 11. Sodium
12. heat – electricity. 13. float – smaller
14. sink – greater
15. sodium hydroxide (alkaline solution) – hydrogen
16. stronger – more 17. halogens.
18. p – right – inert
19. monovalent – gain – negative
20. one – seven 21. gaseous – solid
22. diatomic – two 23. bromine – iodine
24. potassium bromide – iodine.
25. Cobalt 60 – gamma

5

1. $2Na + 2H_2O \longrightarrow 2NaOH + H_2\uparrow$
2. $2K + 2H_2O \longrightarrow 2KOH + H_2\uparrow$
3. $2K + Br_2 \longrightarrow 2KBr$
4. $2Na + Cl_2 \longrightarrow 2NaCl$
5. $2NaBr + Cl_2 \longrightarrow 2NaCl + Br_2$
6. $Br_2 + 2KI \longrightarrow 2KBr + I_2$
7. $Cl_2 + 2KBr \longrightarrow 2KCl + Br_2$

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6

Element	Symbol	Type	Use
1. Nitrogen	N	Nonmetal	Its liquid state is used in preservation of cornea of the eye.
2. Silicon	Si	Metalloid	Silicon slides are used in the manufacture of electronic devices.
3. Radioactive cobalt 60	Co	Transition element	It is used in food preservation.
4. Sodium	Na	Metal	Its liquid state is used in transferring heat from inside the nuclear reactor to outside, to be used to obtain the vapour energy required to generate electricity.

7

1. Because they react with water forming alkaline solutions.
   $2Na + 2H_2O \longrightarrow 2NaOH + H_2\uparrow$
2. To prevent it from the reaction with moist air as it is an active metal.
3. Because it has the lowest atomic size in group (1A) and the chemical activity increases as the atomic size increases.
4. Because the density of lithium is smaller than water density, while the density of cesium is greater than water density.
5. Because potassium is more chemically active than sodium, where the atomic size of potassium is greater than the atomic size of sodium.
6. Because sodium reacts instantly with water and hydrogen gas evolves which burns with a pop sound.
   $2Na + 2H_2O \longrightarrow 2NaOH + H_2\uparrow$
7. Because it has the largest atomic size, so it can lose its valency electron easily.
8. Because they tend to lose their valency electron during chemical reactions forming positive ions and each of them carries one positive charge.
9. Because they react with metals forming salts.
   $2K + Br_2 \longrightarrow 2KBr$
10. Because they are chemically active elements.
11. Because bromine is less active than chlorine.
12. Because alkali metals lose one electron during the chemical reaction and converted into positive ions, and halogens gain one electron during the chemical reaction and converted into negative ions.
13. Because it is a good conductor of heat, where it transfers heat from inside the nuclear reactor to outside. This heat is used to obtain the vapour energy required to generate electricity.
14. Because it emits gamma rays which prevent the reproduction of microbial cells without an effect on human.
15. Because it is a semi-conductor which its ability to conduct electricity depends on temperature.
16. Due to the decrease of its boiling point (–196°C).

8

1. $2Na + 2H_2O \longrightarrow 2NaOH + H_2\uparrow$
2. $2K + 2H_2O \longrightarrow 2KOH + H_2\uparrow$
3. $2Na + Cl_2 \longrightarrow 2NaCl$
4. $2K + Br_2 \longrightarrow 2KBr$
5. $Br_2 + 2NaI \longrightarrow 2NaBr + I_2$
6. $Cl_2 + 2KBr \longrightarrow 2KCl + Br_2$
7. $Cl_2 + 2KI \longrightarrow 2KCl + I_2$
8. $Cl_2 + 2NaBr \longrightarrow 2NaCl + Br_2$

9

1. It is used in transferring heat from inside the nuclear reactor to outside, this heat is used to obtain the vapour energy required to generate electricity.
2. It is used in food preservation, because it emits gamma rays which prevent the reproduction of microbial cells without an effect on human.
3. It is used in preservation of cornea of the eye, due to the decrease of its boiling point (–196°C).
4. Silicon slides are used in the manufacture of electronic devices such as computer, because it is a semi-conductor which its ability to conduct electricity depends on temperature.

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10

Odd word (or symbol)	Scientific term of the rest
1. Helium	Alkali metals.
2. O_2	Halogens
3. Chlorine	Inert gases.

11 1.

P.O.C.	Alkali metals group	Halogens group
Group no.	(1) 1A	(17) 7A
Position :	On the maximum left side of the periodic table.	On the right side of the periodic table.
Block belongs to it :	s-block	p-block
Kind of their elements :	Metals	Nonmetals
Connecting their elements to electricity and heat :	Good conductors of heat and electricity.	Bad conductors of heat and electricity.

2.

P.O.C.	Chlorine	Bromine
The physical state :	Gas	Liquid
Chemical activity :	More active than bromine.	Less active than chlorine.

3.

Fluorine	Helium
- It belongs to halogens group (17) 7A	- It belongs to inert gases group (18) 0
- The outermost energy level of its atom contains 7 electrons.	- The outermost energy level of its atom contains 2 electrons.
- It locates in period (2).	- It locates in period (1).
- An active element.	- An inert gas.
- Its molecule consists of two atoms.	- Its molecule consists of one atom.

12

① 1. Lithium < Sodium < Rubidium < Cesium

2. Li < K < Na < Rb < Cs

② By putting a small piece of sodium in water, hydrogen gas evolves which burns with a pop sound.

$2Na + 2H_2O \longrightarrow 2NaOH + H_2\uparrow$

③ *Look at the main book on pages (70 & 71).*

④ *Answer by yourself.*

⑤ 1. X 2. Z 3. Y

⑥ 1. $_{17}Y$ 2. $_{11}X$ 3. $_{11}X$

4. $_{14}Z$ 5. $_{11}X$, $_{17}Y$

⑦ 1. Z 2. X

13

① 1. Alkali metals – (1) 1A

2. • A : Lithium (Li)

D : Rubidium (Rb).

• The element D sinks in water, because its density is greater than the density of water (1 gm/cm^3).

② 1. Alkali metals – Monovalent.

2. **Answer by yourself.**

3. ∵ Element (Y) locates in the third period and group 1 (1A).

∴ Element (Z) locates in the fourth period and group 1 (1A)

∴ The atomic number of element (Z) = 2 + 8 + 8 + 1 = 19

4. (a) X (b) M

③ 1. Hydrogen gas.

2. An alkaline solution – it turns violet litmus solution into blue.

3. $2Na + 2H_2O \longrightarrow 2NaOH + H_2\uparrow$

④ 1. Potassium. 2. Potassium hydroxide.

3. Because its density is less than the density of water.

4. The intensity of the reaction increases.

5. Potassium sinks in kerosene and it prevents potassium to react with moisst air.

⑤ (a) N and O (b) A and B

(c) L and M (d) B (e) L

⑥ 1. • X is an alkali metal.

• M is a transition element.

• D is an inert gas.

2. 8

3. (a) E, The name of the group is alkali metals group.

(b) C

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⑦ 1. (a) D (b) F

2. Letter "A" represents "Na" element, so the chemical equation of reaction of (Na) with water is :

$2Na + 2H_2O \longrightarrow 2NaOH + H_2\uparrow$

3. (a) two atoms. (b) monovalent – monovalent.

4. As (A) refers to an element from alkali metal group, so the type of oxide is "Basic oxide".

5. Because element (D) is a halogen which has 7 electron in the outermost energy level, so it needs for one electron to reach to stability form, so (D) is found in diatomic state.
∴ Letter D refers to element (Cl), so its physical state is a gas

14 Because the density of lithium is less than the density of kerosene, so it floats on its surface. At the same time, the density of lithium is more than the density of paraffin oil, so it sinks in it and it is isolated from moist air and doesn't react with it.

Thinking Skills Questions

① 1. b 2. b 3. c

② a. • Atomic number of (X) is 11
• Block of (X) is s-block.
• Atomic number of (Y) is 17
• Block of (Y) is p-block.

b. Salt – (NaCl)

c. No, because both of them are metals.

③ a. ∵ Element (M) reacts with water forming a compound, its formula (MOH)
∴ The valency of element (M) is monovalent.

b. ∵ Element (M) is a monovalent metal.
∴ The number of electrons in the outermost energy level in its atom = 1 electron.
∵ Element (M) locates in period (3).
∴ No. of energy levels occupied with electrons in its atom = 3 energy levels.
∴ The atomic number of element (M) = 2 + 8 + 1 = 11

c. s-block.

d. Hydrogen gas.

e. Basic oxide.

④ 1. No, because each of them locates in group (1A) and the properties of the same group are similar.

2. No, because fluorine is a nonmetal belongs to halogens group that its atoms tend to gain one electron during the chemical reaction forming negative ions, each of them carries one negative charge.

Lesson 4

1

1. c	2. c	3. c	4. a
5. d	6. b	7. c	8. d
9. d	10. a	11. d	12. c
13. c	14. d	15. b	16. a
17. c	18. b	19. c	20. b
21. a	22. c	23. a	24. c
25. b			

2 1. a 2. d 3. c

3
1. (×) ..... one oxygen atom and two hydrogen atoms.
2. (×) ..... by hydrogen bonds.
3. (×) ..... two single covalent bonds.
4. (✓) 5. (✓) 6. (✓)
7. (×) ..... decreases on freezing.
8. (×) ..... hexagonal shape and large volume.
9. (✓) 10. (✓)
11. (×) ..... at the anode ..... at the cathode.
12. (×) ..... water electrolysis.
13. (×) ..... natural environmental pollutants.
14. (×) Biological pollution .....
15. (×) ..... of lead .....
16. (×) ..... chemical water pollution.

4
1. Water molecule. 2. Single covalent bond.
3. Hydrogen bond. 4. Water.
5. Hofmann's voltameter. 6. Anode.
7. Oxygen gas. 8. Cathode.
9. Hydrogen gas. 10. Water pollution.
11. Natural environmental pollutants.
12. Artificial environmental pollutants.
13. Biological water pollution.
14. Chemical water pollution.
15. Lead. 16. Mercury.
17. Arsenic. 18. Thermal water pollution.
19. Radiant water pollution.

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5

1. agricultural fields – industrial fields – personal fields.
2. oxygen – hydrogen
3. hydrogen – electronegativity
4. single covalent – hydrogen
5. solvent – ionic
6. Table salt – sugar
7. oil – hydrogen
8. 100°C – 0°C
9. hydrogen
10. decreases – increases.
11. 4°C – hydrogen
12. hexagonal – volume.
13. neutral
14. Hofmann's voltameter – electric
15. anode – cathode.
16. oxygen – hydrogen
17. hydrogen – 14
18. natural – artificial
19. biological – thermal – radiant
20. bilharzia – hepatitis.
21. lead – brain
22. blindness – liver cancer
23. biological – radiant
24. factories – sewage
25. Thermal – temperature
26. purification – drinking water tanks
27. plastic – chlorine – cancer.

6

Origin of water pollution	Kind of pollution	Harms
1. Discharging factories wastes and sewage in seas and rivers.	**Chemical** pollution.	• Blindness. • **Liver cancer.** • **Death of brain cells.**
2. **Mixing animals and human wastes with water.**	Biological pollution.	• **Bilharzia.** • Typhoid. • **Hepatitis.**
3. **Dumping the atomic wastes in the oceans and seas.**	Radiant pollution.	—
4. Using of water of some marine zones for cooling the nuclear reactors.	**Thermal** pollution.	• **Death of marine creatures.**

7

1. Due to the presence of hydrogen bonds between water molecules.
2. Due to the higher electronegativity of oxygen compared with hydrogen.
3. Because water is a good polar solvent for most ionic compounds (as table salt).
4. Because water is a good polar solvent.
5. Because sugar molecules can form hydrogen bonds with water molecules.
6. Because it is a covalent compound which cannot form hydrogen bonds with water.
7. Because when the temperature of water becomes less than 4°C, water molecules are collected together by hydrogen bonds forming large-sized hexagonal ice crystals with many spaces between them, so its volume increases and thus its density decreases.
8. Because the density of ice is less than the water density.
9. Because the density of ice is less than that of water at 4°C
10. Due to formation of a layer of ice on the surface of liquid water protects the deep water from freezing which preserves the life of the marine organisms in it.
11. Because when water freezes, its volume increases.
12. Because pure water has a neutral effect on litmus paper dye.
13. To make water conduct electricity, where pure water is a bad conductor of electricity.
14. Because oxygen gas evolves at the anode, that increases the glowing of splint.
15. Because biological water pollution causes the infection with many diseases such as : bilharzia, typhoid and hepatitis.
16. Because chemical water pollution causes dangerous diseases such as the death of brain cells, blindness and liver cancer.
17. Because this leads to death of brain cells.
18. Because this leads to the separation of the dissolved oxygen in water.
19. Because plastic reacts with chlorine gas which is used as water disinfectant, leading to the increase in the infection rates by cancer.

8

1. It is a type of weak electrostatic attraction that originates between the molecules of some polar compounds.
2. It is the addition of any substance to the water which causes continuous gradual change in water properties affecting the health and the life of living creatures.

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9 1. The abnormality of water properties such as : rising of its boiling and freezing points and decreasing its density on freezing.
2. The water molecules are collected together by hydrogen bonds forming large-sized hexagonal ice crystals with many spaces between them so, its volume increases and thus its density decreases.
3. It will be exploded because when water freezes its volume increases.
4. - The acidified water decomposes into hydrogen gas evolves at the cathode and oxygen gas evolves at the anode.
- The ratio between the produced hydrogen gas and oxygen gas is about (2 : 1) by volume respectively.
5. It causes biological pollution of water which causes the infection by many diseases such as bilharzia, typhoid and hepatitis.
6. It causes the death of brain cells.
7. It causes blindness.
8. It increases the infection rate by liver cancer.
9. Radiant water pollution occurs.
10. Plastic reacts with chlorine gas which is used as water disinfectant leading to the increase in the infection rates of cancer.

10 1. This leads to biological water pollution.
2. This leads to chemical water pollution.
3. This leads to thermal water pollution which causes death of marine creatures.

11 1.

P.O.C.	Table salt	Food oil
• Type of the compound :	Ionic	Covalent
• Dissolving in water :	Dissolves in water.	Doesn't dissolve in water.

2.

P.O.C.	Bonds between atoms of water molecule	Bonds between water molecules
• Type :	Single covalent bonds	Hydrogen bonds
• Strength :	Stronger than the hydrogen bonds.	Weaker than the covalent bonds.

3. • **Pure water :** It is a bad conductor of electricity.
• **Acidified water :** It is a good conductor of electricity.
4. ***Look at the main book on page (96).***
5. ***Look at the main book on page (97).***
6. ***Look at the main book on page (97).***

12 1. It is very important for survival of all living organisms and it is used in :
• Agricultural fields.
• Industrial fields.
• Personal fields.
2. It is used for electrolysis of water to its elements.

13 ***Look at the main book on page (97).***

14 ① ***Look at the main book on page (90).***
② The density of water in solid state (ice) is lower than its density in liquid state.
- The maximum density of pure water is at 4°C and the lowest density of water, when it is ice 0°C.
③ By adding violet litmus solution :

Bottle (1)	Bottle (2)	Bottle (3)
The solution turns into red.	The solution turns into blue.	No change occurs.

④ • $2Na + 2H_2O \longrightarrow 2NaOH + H_2\uparrow$
• $2H_2O \xrightarrow{\text{Electrolysis}} 2H_2\uparrow + O_2\uparrow$
⑤ ***Look at the main book on page (98).***

15 ***Look at the main book on page (94).***

16 ① 1. At point (A) = 0°C
At point (B) = 4°C
2. At point (B).

② 1. $2H_2O \xrightarrow{\text{Electrolysis}} 2H_2\uparrow + O_2\uparrow$
2. volume of hydrogen = 12 cm^3
3. a. Hydrogen gas.
b. Oxygen gas.

③ 1. (X) oxygen gas – (Y) hydrogen gas.
2. Volume of oxygen = 4 cm^3.

④ 1. Hofmann's voltameter – It is used for electrolysis of water to its elements.
2. (1) Acidified water. (2) Oxygen gas.
(3) Hydrogen gas. (4) Anode.
(5) Cathode.
3. $2H_2O \xrightarrow{\text{Electrolysis}} 2H_2\uparrow + O_2\uparrow$

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4. * Above the anode: it glows more.
   * Above the cathode: it burns with a pop sound.
5. Volume of oxygen gas = 10 cm^3.

⑤ 1. No, because pure water is a bad conductor of electricity.
2. The lamp illuminates, because sodium carbonate makes water conducts electricity.

17 It may be expected to increase pollution of the Nile as a result of human and industrial activities, or decrease the rate of pollution in case of the development of environmental awareness among members of society and the development of legal controls.

Thinking Skills Questions

① 1. a 2. c 3. c 4. c 5. b

② a. (1) Sodium hydroxide and hydrogen gas.
(2) carbonic acid
(3) Magnesium hydroxide.

b. (2) Acidic solution. (3) Alkaline solution.

c. It changes the colour of litmus paper into blue, because it is an alkaline solution.

d. (1) gas (A) : Hydrogen gas.
gas (B) : Oxygen gas.
(2) Hofmann's voltameter.

③ 1. Bond (X) is a hydrogen bond.
Bond (Y) is a single covalent bond.
2. (Y) Covalent bond is stronger than (X) hydrogen bond.
3. (X) Hydrogen bond.
4. (a) water (b) 104.5°

④ 1. Its boiling and its freezing points decrease, and its density increases on freezing.
2. Water will freeze in these regions, so the aquatic organisms that live in these areas will freeze which leads to destroy them.

Project On UNIT ONE *Answer by Yourself*

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Unit Two

Lesson 1

1

1. a	2. c	3. a	4. a	5. b
6. a	7. a	8. c	9. b	10. d
11. a	12. b	13. c	14. b	15. a
16. d	17. c	18. d	19. b	20. c
21. c	22. c	23. c	24. d	25. d

2

① 1. d		2. a	3. b	4. e
② 1. b		2. d	3. c	4. a

3

1. (✓)
2. (✗) ..... the weight .....
3. (✓) 4. (✓)
5. (✗) ..... decreases .....
6. (✓) 7. (✓) 8. (✓)
9. (✗) ..... and mesosphere.
10. (✗) ..... troposphere layer.
11. (✗) ..... is 13 kilometres.
12. (✗) Troposphere layer .....
13. (✗) ..... decreases .....
14. (✗) ..... lower part of stratosphere.
15. (✗) Mesosphere is .....
16. (✗) ..... in stratosphere layer.
17. (✓) 18. (✓) 19. (✓)
20. (✓) 21. (✓)
22. (✗) ..... as exosphere. 23. (✓)

4

1. Atmospheric air (envelope).
2. Atmospheric pressure. 3. Bar or millibar.
4. Normal atmospheric pressure.
5. Barometer. 6. Aneroid.
7. Altimeter. 8. Isobar.
9. Tropopause. 10. Stratopause.
11. Mesopause. 12. Troposphere.
13. Stratosphere. 14. Mesosphere.
15. Thermosphere. 16. Ionosphere.
17. Van-Allen Belts.
18. Aurora phenomenon 19. Exosphere.

5

1. gaseous – atmospheric envelope.
2. atmospheric pressure.
3. the atmospheric pressure.
4. 1000 5. 1013.25
6. Aneroid – altimeter 7. increases
8. decreases – decreases.
9. 3 – 90 10. less
11. high – low
12. four – troposphere – thermosphere.
13. tropopause – mesopause
14. Troposphere – 13 km. 15. 6.5 – 1 km
16. 100 mbar – (- 60°C) 17. 75 – 99
18. vertical – upward – downward.
19. Stratosphere – ozonic
20. 37 21. (- 60) – 0
22. ozone – ultraviolet 23. decreases – 0.001
24. lower – clouds 25. ozone – 20 – 40
26. Mesosphere – 35 km.
27. decreases – (- 90°C) 28. hydrogen – helium
29. Thermosphere – thermal
30. increases – 1200 31. ionosphere – 700
32. thermosphere – mesosphere.
33. Van-Allen – Earth. 34. Aurora – poles
35. troposphere – exosphere

6

Atmospheric layer	Order	Thickness	Temperature at its top
1. Stratosphere	The second	37 km	0°C
2. Thermosphere	The fourth	590 km	1200°C
3. Mesosphere	The third	35 km	– 90°C
4. Troposphere	The first	13 km	– 60°C

7

1. Due to decreasing the height of air column.
2. Due to the difference in the length of air column from an area to another on the Earth's surface.
3. Because it is used by pilots in aeroplanes to determine their elevations above sea level.
4. Because winds move from regions of high atmospheric pressure to that of low atmospheric pressure.
5. Because all atmospheric turbulences take place in it.
6. Because in troposphere layer, the temperature decreases as we go up by a rate (6.5°C) for each 1 km height.
7. Because it contains about 75% of the mass of atmospheric envelope.
8. Because it contains 99% of atmospheric water vapour.
9. Because the hot air currents (less density) move upwards, while cold air currents (high density) move downwards.
10. Because it contains most of ozone gas (O_3) which is found in atmospheric envelope.

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11. This is due to the absorption of ultraviolet rays (emitted from the Sun) by ozone layer, which is present at its upper part.
12. Because in this part, the air movement is horizontally and neither clouds nor weather turbulences exist.
13. Because it is the middle layer.
14. Because the temperature in this layer decreases with a high rate as we go up until it reaches (– 90°C) at its top.
15. Because it contains a limited amount of helium and hydrogen gases only.
16. Due to burning of this celestial rocky masses as a result of their friction with air molecules.
17. Because it is the hottest layer in atmospheric envelope.
18. Because it contains charged ions.
19. Because it reflects radio waves transmitted by radio stations and communication centres.
20. Because they scatter the harmful charged cosmic radiations away from the Earth.
21. Due to scattering of harmful charged cosmic radiations away from the Earth by Van-Allen Belts.

8

1. It is a gaseous envelope surrounding the Earth that rotates with it around its axis and it extends about 1000 km above sea level.
2. It is the weight of air column of an atmospheric height on a unit area ($1m^2$).
3. It is the atmospheric pressure at sea level.
4. Curved lines that join the points of equal pressure in atmospheric pressure maps.
5. It is the region between troposphere and stratosphere.
6. It is the region between stratosphere and mesosphere.
7. It is the region between mesosphere and thermosphere.
8. They are two magnetic belts surrounding ionosphere.
9. It is a phenomenon appears as brightly coloured light curtains at the two poles of the Earth.
10. It is a region in which the atmospheric envelope is inserted in outer space.

9

1. They are used to measure the atmospheric pressure.
2. It is used by pilots in aeroplanes to determine their altitude above sea level.
3. It is used to determine the possible day weather.
4. It is used to join the points of equal pressure in atmospheric pressure maps.
5. It organizes the Earth's temperature.
6. It is a suitable region for flying aeroplanes.
7. It protects the planet Earth from celestial rocky masses that enter the atmospheric envelope by formation of meteors.
8. It is important in wireless communications and broadcasting.
9. They play an important role in scattering of harmful charged cosmic radiations away from the Earth.
10. They transmit weather conditions information and TV programs.
11. It is suitable for the satellites to orbit around the Earth.

10

1. 1000 km.
2. 1013.25 mbar.
3. 99%
4. 37 km.
5. 0°C
6. 20 km.
7. 0.01 mbar.
8. 1200°C
9. 700 km above sea level.

11

1. The pressure on the diving person increases, because the total pressure on him equals the sum of both the normal atmospheric pressure and the water pressure.
2. The temperature decreases with a rate 6.5°C for each 1 km height and the atmospheric pressure decreases.
3. The temperature decreases and the atmospheric pressure increases.
4. They burn forming meteors.
5. The cosmic radiations are scattered which lead to the occurrence of Aurora phenomenon.

12

1. ***Look at the main book on page (117).***
2. ***Look at the main book on page (128).***
3. **Tropopause :** It locates between troposphere and stratosphere layers.
   Stratopause : It locates between stratosphere and mesosphere layers.

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4.

P.O.C.	Ionosphere layer	Exosphere layer
Definition :	It is a layer that contains charged ions, and it exists in the upper part of thermosphere and extends up to 700 km above sea level.	It is a region in which the atmospheric envelope is inserted in outer space.
Importance :	It is very important in wireless communications and broadcasting.	In which, satellites orbit around the Earth.

5. ***Look at the main book on page (128).***

13 1. Height (km) = 10000 ÷ 1000 = 10 km
The decrease in temperature
= Height (km) × 6.5 °C = 10 × 6.5
= 65°C
The temperature at this height = temperature at the sea level – the decrease in temperature
= 24 – 65 = – 41°C

2. Height (km) = 2000 ÷ 1000 = 2 km
The decrease in temperature
= Height (km) × 6.5 °C = 2 × 6.5 = 13°C
The temperature at a certain height = temperature at sea level – the decrease in temperature = 23 – 13 = 10°C

3. The decrease in temperature
= Height (km) × 6.5°C
= 13 × 6.5 = 84.5°C
The temperature at the top of troposphere = temperature at sea level – the decrease in temperature = 24.5 – 84.5 = – 60°C

4. The amount of change in temperature
= temperature at its foot – temperature at its top
= 30 – (– 6) = 36 °C
The height of the mountain
$= \frac{\text{The change in temperature}}{6.5°C} = \frac{36}{6.5} = 5.53$ km.

5. a- The decrease in temp. (A : B)
= Height × 6.5°C = 1 × 6.5 = 6.5°C
The temp. at point (B) = 26.5 – 6.5 = 20°C
b- Depth in km = 500 ÷ 1000 = 0.5 km
The height (C : B) = 1 + 0.5 = 1.5 km
∴ The increase in temp. (C : B)
= Height (km) × 6.5°C = 1.5 × 6.5 = 9.75°C
The temp. at point (c)
= 10.25 + 9.75 = 20°C

14 ① Troposphere – Stratosphere – Mesosphere – Thermosphere.

②

Altitude above sea level	3 km	6 km	9 km	12 km
Temperature at this height	4.5°C	– 15°C	- 34.5°C	- 54°C
Atmospheric pressure	731 mbar	503 mbar	323 mbar	203 mbar

③ - At the lower part of stratosphere layer.
- Because at its beginning the atmospheric pressure is 100 mbar and it decreases as we go up until it becomes 1 mbar at its top.

④ ***Look at the main book on page (116).***

⑤ 1. Aurora phenomenon.
2. Due to scattering of harmful charged cosmic radiations away from the Earth by Van-Allen Belts.
3. At the two poles of the Earth.

15 ① 1. a. Altimeter. b. Aneroid.
2. ***Look at the main book on page (117).***

② 1. isobar.
2. the centre of high atmospheric pressure areas -the centre of low atmospheric pressure areas.
3. The wind moves from H to L.

③ The amount of change in temperature
= 19.25 – 3 = 16.25°C
∴ The height of the aeroplane from the surface of the Earth $= \frac{16.25}{6.5} = 2.5$ km.
∴ The height of the building
= 2.5 – 2 = 0.5 km = 500 m.

④ 1. (A) Thermosphere layer.
(B) Mesosphere layer.
(C) Stratopause.
(D) Stratosphere layer.
(E) Troposphere layer.
2. a. Thermosphere layer.
b. Mesosphere layer.

⑤ 1. a. Troposphere layer.
b. Stratosphere layer.
2. a. 0°C , (– 60°C)
b. 0°C , (– 90°C)

⑥ 1. -Van-Allen Belts.
- They surround the ionosphere layer.
2. Aurora phenomenon.

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Thinking Skills Questions

① 1. d 2. b 3. d 4. a 5. b 6. a

② a. Air will not transfer from any place to another on the Earth's surface, and no wind will be formed.

b. Radio stations and communication centres can't transmit radio waves.

③ ∵ Snow is formed at a temperature = Zero°C

∴ The amount of decrease in temperature = 26 – Zero = 26°C

∴ The height = $\frac{26}{6.5}$ = 4 km.

∴ The snow begins to appear at 4 km.

④ - Difference in height between (A) and (B) = 10 – 8 = 2 km.

- Difference in temperature between (A) and (B) = 2 × 6.5 = 13°C

⑤ - Height of this point = 13 – 5 = 8 km.

- Decrease in temperature = 8 × 6.5 = 52°C

- Temperature at this point = 24.5 – 52 = – 27.5°C

⑥ - The value of decreasing in temperature = 5 × 6.5 = 32.5°C

∴ The temperature at the top of the mountain = 30 – 32.5 = – 2.5°C

- The bottle will explode, because the volume of water increases when it freezes.

⑦ - The amount of decrease in temperature = 15 × 6.5 = 97.5°C

- The temperature outside the aeroplane = 35 – 97.5 = – 62.5°C

- The difference in temperature between inside and outside the aeroplane = 20 – (– 62.5) = 82.5°C

⑧ - The amount of increase in temperature (C to B) = 2 × 6.5 = 13°C

∴ The temperature at point (C) = 5 + 13 = 18°C

- The amount of change in temperature (A to C) = 24 – 18 = 6°C

- The height of the point (C) from the point (A) = $\frac{6}{6.5}$ = 0.923 km = 923 m.

⑨ a. The difference in temperature = zero – (– 90) = 90°C

b. ∵ The height of troposphere layer is 13 km.

∵ The amount of increase in temperature = 13 × 6.5 = 84.5°C

∴ The temperature (X) = (– 60) + 84.5 = 24.5°C

Lesson 2

1

1. b	2. c	3. c	4. c	5. b
6. c	7. c	8. b	9. a	10. c
11. c	12. c	13. b	14. d	15. d
16. d	17. b	18. d	19. a	20. c
21. b	22. b	23. b	24. c	25. d
26. a	27. a			

2

① 1. b 2. d 3. e 4. a

② 1. b 2. d 3. a

③ 1. c 2. a 3. f 4. b 5. d

3

1. (✓)
2. (✗) ..... three oxygen atoms.
3. (✗) ..... to 40 km .....
4. (✗) ..... oxygen molecule into .....
5. (✗) Dobson is .....
6. (✗) Nanometre (nm) = 1×10^{-9} m.
7. (✗) ..... all near ultraviolet rays and 5% of medium ultraviolet rays.
8. (✓) 9. (✓) 10. (✓)
11. (✓) 12. (✓)
13. (✗) Nitrogen oxides .....
14. (✓) 15. (✓) 16. (✓)
17. (✗) ..... its long wavelength.
18. (✓) 19. (✓) 20. (✓)
21. (✓)

4

1. Ozone gas.
2. Oxygen gas.
3. Ultraviolet radiation.
4. Stratosphere layer.
5. Dobson.
6. Ozone layer.
7. Far ultraviolet rays.
8. Medium ultraviolet rays.
9. Near ultraviolet rays.
10. Far and medium ultraviolet rays.
11. Ozone hole.
12. Chlorofluorocarbon compound (freon).
13. Methyl bromide gas.
14. Halons.
15. Nitrogen oxides.
16. Global warming phenomenon.
17. Greenhouse gases.
18. Carbon dioxide gas.
19. Infrared radiation.
20. Greenhouse effect.

5

1. Erosion of ozone layer – global warming phenomenon
2. 20 – 40
3. oxygen – 20

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4. Ozone molecule
5. (a) O (b) O_2
6. 3 – 300
7. near – medium – far
8. 1×10^{-9}
9. near – medium
10. south – September
11. freon – air conditioning sets.
12. CFC_S – halons
13. Methyl bromide gas 14. Nitrogen
15. the continuous increase in the average temperature of the Earth's near surface air.
16. fossil fuel – forests fires.
17. carbon dioxide (CO_2) – methane gas (CH_4)
18. visible light – short-waved
19. Infrared – a long
20. chemical – thermal
21. Melting the snow of two poles – severe climatic changes
22. Forests fires – drought waves

6

1. Because it is the first layer in the atmospheric envelope which contains suitable amount of oxygen gas, faces ultraviolet radiations emitted from the Sun.
2. Because it doesn't allow penetration of all far and most of medium ultraviolet radiations which have harmful chemical effects and threaten the life of living organisms
3. Due to increasing the amount of pollutants which are emitted at this time every year.
4. Because they cause erosion of ozone layer and global warming phenomenon.
5. To reduce the use of chlorofluorocarbon compounds as they are used in making foam backing.
6. Because freon causes erosion of ozone layer and global warming phenomenon.
7. Because their exhausts contain nitrogen oxides that causes erosion of the ozone layer.
8. Due to increasing of greenhouse gases in the atmosphere.
9. Due to fossil fuel burning, cutting trees and forests fires.
10. Because it has a long wavelength.
11. Because the Earth's atmosphere resembles the role of glass in greenhouse as it prevents penetration of infrared radiation causing increasing of Earth's temperature.
12. Because it causes melting of the snow of both south and north poles and also it causes severe climatic changes.
13. To prevent increasing the percentage of CO_2 gas which increases the temperature of planet Earth.

7

1. It is the measuring unit of ozone degree.
2. It means standard temperature and pressure i.e. it is the normal atmospheric pressure at 0°C temperature.
3. Thinning or losing parts of ozone layer above the south pole.
4. Chlorofluorocarbon compounds.
5. Intergovernmental Panel on Climate Changes.
6. It is an increase in the average temperature of the Earth's near-surface air.
7. **Answer by yourself.**
8. It is the trapping of infrared radiation in the troposphere layer due to the increase in the percentage of greenhouse gases which cause the increase in the planet Earth's temperature.

8

1. Ozone molecule.
2. The wavelength of medium ultraviolet rays.
3. Nanometre.
4. Ozone layer.
5. The normal degree of ozone.

9

1. It helps in the formation of ozone gas molecules.
2. It acts as a protective shield for living organisms against the harmful chemical effects of ultraviolet radiations.

3 : 5 ***Look at the main book on page (145).***

10

1. Chlorofluorocarbon compounds (CFC_S).
2. Carbon dioxide gas.
3. Tropical hurricanes, such as hurricane Katrina in 2005.

11

1. ***Look at the main book on page (142).***
2. Increase of CO_2 in air causes the increase in the temperature of near-surface air of planet Earth.
3. Trapping of infrared radiation in the troposphere layer increases the temperature of near-surface air of planet Earth.

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12

Odd word	Scientific term
1. Water vapour.	- Pollutants of ozone layer.
2. Extinguishing fires.	- Uses of freon.
3. Methyl bromide	- Greenhouse gases.
4. Greenhouse effect	- Severe climatic changes.

13

1. The bond between oxygen molecule is broken down giving two free oxygen atoms (2O).
2. Ozone molecule is formed.
3. The thickness of ozone layer will be 3 mm only.
4. , 5. & 6. Erosion of ozone layer increases and also the temperature of the Earth increases.
7. Medium and far UV rays penetrate ozone layer and cause harmful effects.
8. Increasing the temperature of near-surface air of planet Earth.
9. Occurrence of greenhouse effect phenomenon which causes the increase in the planet Earth's temperature.
10. The level of seas and oceans would increase and therefore :
    - Disappearance of some coastal areas.
    - Extinction of some polar animals like the polar bear and seals.
11. Tropical hurricanes, destroying floods, drought waves and forest fires take place.
12. The percentage of CO_2 gas increases in the atmospheric air by a continuous way which leads to occurrence of global warming phenomenon.

14 1.

Points of comparison	Oxygen molecule	Ozone molecule
Structure :	It consists of two oxygen atoms.	It consists of three oxygen atoms.
The effect of ultraviolet radiations on each of them	They break down the bond in oxygen molecule to give two free oxygen atoms (2O)	The ozone molecule absorbs the harmful ultraviolet radiations, while it permits the passage of the useful ultraviolet radiations.

2.

Points of comparison	Far ultraviolet radiations	Near ultraviolet radiations
The percentage which penetrates ozone layer :	0%	100%
The wavelength :	100 : 280 nm	315 : 400 nm

3.

Points of comparison	Greenhouse effect	Ozone hole
Causes :	Increasing the percentage of greenhouse gases in the atmosphere, such as : water vapour (H_2O) and Nitrous oxide (N_2O).	The atmosphere contains compounds that pollute the ozone layer such as : chlorofluorocarbon, methyl bromide gas, halons and nitrogen oxides.
Harms :	Increasing the temperature of the near-surface air of planet Earth which leads to global warming phenomenon.	Penetration of harmful ultraviolet rays to the Earth's surface which threaten living organisms by their chemical effects.

15

① 1. 20 km. 2. Oxygen element.
3. a. ultraviolet b. 3 mm.
4. (✗).

② $O_2 \xrightarrow{UV} O + O$

$O_2 + O \longrightarrow O_3$

③ 1. CFC_S compounds, methyl bromide gas, halons and nitrogen oxides.
2. Freon. 3. Nitrogen oxides.
4. The ozone layer can be protected by the following ways :
   - The use of chlorofluorocarbon compounds must be reduced and find safer alternatives.
   - Stop producing the ultrasound concorde planes as their nitrogen oxides affect the ozone layer.

④ 1. Global warming phenomenon.
2. Occurrence of greenhouse effect as a result of increasing the percentage of greenhouse gases.
3. Melting of polar ice would increase the level of seas and oceans and causes extinction of some polar animals like polar bear and seals.

⑤ 1. *Look at the main book on pages (149 & 150).*
2. *Look at the main book on page (148).*

⑥ Degree of erosion of ozone layer = 300 – 255 = 45 dobson The percentage of erosion of ozone layer = $\frac{45}{300} \times 100 = 15\%$

⑦ 1. *Look at the main book on page (150)*

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2. The increasing of the temperature of the near-surface air of planet Earth as a result of the global warming phenomenon.

16 ① 1. Fig. (c) 2. Fig. (b) 3. Fig. (a)

② 1. (1) Near ultraviolet rays.
(2) Medium ultraviolet rays.
(3) Far ultraviolet rays.
2. Rays no. (1).
3. (A) : ozone layer / 20 km / stratosphere layer.
4. Chlorofluorocarbon compounds, methyl bromide gas, halons and nitrogen oxides.

③ 1. Carbon dioxide gas (CO_2).
2. Bottle (2), due to increasing the percentage of carbon dioxide gas which resembles greenhouse effect.

④ 1. Area (B), because the percentage of carbon dioxide gas in it is lower than area (A).
2. Global warming phenomenon.

⑤ 1. Greenhouse effect.
2. When the percentage of greenhouse gases increases in the atmosphere, greenhouse effect occurs (the temperature of the Earth increases) leading to the global warming phenomenon.
3. Infrared radiation.

Thinking Skills Questions

① When the green plants make photosynthesis process, this leads to decreasing the percentage of carbon dioxide gas in the atmosphere which reduces the greenhouse effect and thus lowering the occurrence of global warming phenomenon.

② a. 100 %
b. As it has a longer wavelength than medium and far UV.

③ 75

④ (d)

⑤ 1. (A) Visible rays and short-waved rays.
(B) Infrared radiation.
2. Greenhouse effect.

Project On UNIT TWO *Answer by Yourself*

Unit Three

Lesson 1

1

1. b	2. c	3. b	4. b	5. b
6. b	7. a	8. c	9. c	10. a
11. b	12. d	13. b	14. a	15. b
16. b	17. b	18. c	19. a	20. d
21. d	22. c	23. b	24. c	25. d
26. c	27. a			

2 ① 1. c 2. b 3. e

② 1. e 2. d 3. f 4. a

3
1. during its life 2. mammoth
3. snow. 4. resinous
5. mold 6. cast
7. fossils. 8. petrified
9. Index 10. coral
11. Nummulites
12. a hot and rainy tropical environment.
13. fish 14. Archaeopteryx
15. radiolaria

4
1. Fossils. 2. Trace. 3. Remains.
4. A complete body fossil.
5. Amber. 6. Mold.
7. Cast. 8. Petrified woods.
9. Petrification. 10. Index fossils.
11. Fossil record.

5
1. old living – sedimentary
2. Traces – remains
3. Dinosaur's foot print – worms' tunnels
4. Shark's teeth – dinosaur's skull
5. formation.
6. mold – cast – petrified fossils.
7. snow.
8. mammoth – snow
9. Pine – amber – decomposition.
10. Ammonites fossil – nummulites fossil
11. Fish cast – cast of ferns
12. solid mold – cast. 13. a solid mold
14. minerals – petrified 15. organic – shape
16. Petrified wood – petrified dinosaur's eggs
17. wood mountain – petrified woods
18. life evolution – paleoenvironment.
19. Index – sedimentary

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20. nummulites – limestone
21. a hot – tropical
22. clear – shallow
23. sea – land.
24. Algae – angiosperms
25. Fish – amphibians.
26. birds – reptiles.
27. reptiles – birds.
28. petroleum – sedimentary rocks.

6

1. Because when it died , it was rapidly buried in snow which preserved it from decomposition.
2. Because it preserved the bodies of insects inside it from decomposition.
3. Because it is a replica of the internal details of the snail of ammonites.
4. Due to replacing the organic matter of wood by minerals part by part.
5. Because it contains petrified woods which look like rocks.
6. Because they give us the details about the life of an old plant.
7. Due to the presence of nummulites fossils in the limestone rocks of El-Mokattam mountain.
8. Because they indicate the age of sedimentary rocks, as the age of rocks is the same age of fossils existed in them.
9. Because the index fossils are the fossils of living organisms that lived for a short period of time in the past and had a wide geographic distribution, then became extinct and these conditions are not available in all fossils.
10. Because the presence of foraminifera and radiolaria in the rocks of the exploratory wells indicate the suitable conditions of petroleum formation.

7

1. They are traces and remains of old living organisms that are preserved in sedimentary rocks.
2. Traces of an old living organism indicate its activity during its life.
3. Traces that indicate the remains of an old living organism after death.
4. It is a fossil that keeps the whole shape and all the details of the body of the living organism as a result of its rapid burying as soon as it died in a medium that preserves it from decomposition.
5. It is the solidified resinous matter which was secreted by pine trees in old geologic ages.
6. It is the replica of the internal details of the structure of an old living organism left after its death in sedimentary rocks.
7. It is the replica of the external details of the structure of an old living organism left after its death in sedimentary rocks.
8. They are fossils in which minerals replace the organic matter of an old living organism, after its death, part by part leaving the shape without any change.
9. They are fossils which are formed as a result of replacing the wood material of trees with minerals, part by part, giving us details about the life of an old plant.
10. It is the process of conversion of the parts of old living organisms to rocky materials as a result of replacing the organic material of the organism with minerals, part by part.
11. They are the fossils of organisms that had lived for a short period of time in the past and had a wide geographical range, then became extinct.
12. The sequence of fossils in sedimentary rocks layers according to their sequence of appearance from simple to complicated.

8

1. Dinosaur's foot print.
2. Remains of shark's teeth.
3. Mammoth fossil.
4. Fish cast.
5. Ammonites fossil.
6. Petrified dinosaur's eggs.
7. Nummulites fossils.
8. Archaeopteryx.
9. Radiolaria.

9

1. They help in :
   - Age determination of sedimentary rocks.
   - Figuring out the paleoenvironment.
   - Studying life evolution.
   - Petroleum exploration.
2. They indicate the age of sedimentary rocks in which they are found.
3. They indicate that the area of El-Mokattam mountain was a sea floor more than 35 million years ago.
4. They indicate that the environment where they lived was clear, warm and shallow seas.
5. They indicate that the environment where they lived was a hot and rainy tropical environment.

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6. Its study indicates the sequence of appearance of living organisms from simple to complicated according to the sequence of appearance of their fossils in sedimentary rocks layers.
7. They indicate :
   - The age of rocks existed in exploratory wells.
   - The suitable conditions of petroleum formation.

10 1.

Trace	Remains
Traces indicate the activity of an old living organism during its life. Ex. : Traces of worm's tunnels.	Traces indicate the remains of an old living organism after death. Ex. : Remains of dinosaur's skull.

2. ***Look at the main book on page (168).***

3.

Cast	Mold
It is the replica of the external details of the structure of an old living organism left after its death in sedimentary rocks. Ex. : Fish cast.	It is the replica of the internal details of the structure of an old living organism left after its death in sedimentary rocks. Ex. : Trilobite fossil.

4.

Cast	Trace
It is the replica of the external details of the structure of an old living organism leaving them in the sedimentary rocks after death. Ex. : Fish cast.	Traces that indicate an activity of an old living organism leaving them in sedimentary rocks during its life. Ex. : Dinosaur's foot print.

5. ***Look at the main book on page (172).***

6.

Coral fossils	Ferns fossils
They indicate that the environment where they lived was clear warm shallow seas.	They indicate that the environment where they lived was a hot and rainy tropical environment.

7.

Nummulites fossil	Foraminifera fossil
It indicates that the area of El-Mokattam mountain was a sea floor more than 35 million years ago.	It indicates : - The age of rocks existed in the exploratory wells. - The suitable conditions of petroleum formation.

11

Odd word	Suitable name
1. Fossil record.	Types of fossils.
2. Fossil of ferns.	Solid mold fossils.
3. Nummulites fossil.	Petrified fossils.
4. Petrified fossils.	Importance of fossils.

12
1. A complete body fossil of it is formed.
2. The bodies of insects are preserved inside it from decomposition.
3. A solid mold fossil for snail is formed which carries the internal details of its structure.
4. A cast of shell is formed carrying the external details of its shell.
5. It changes into petrified wood.

13
1. The presence of nummulites fossils in the limestone rocks of El-Mokattam mountain.
2. • Algae appeared before mosses & ferns.
   • Gymnosperms appeared before angiosperms.
   • Invertebrates appeared before vertebrates.
3. The environment contains coral fossils.
4. The environment contains ferns fossils.
5. The rocks samples contain the microfossils such as foraminifera and radiolaria.

14
① a. **Fossils :** They are traces and remains of old living organisms that are preserved in sedimentary rocks.
b. **Types of fossils :**
(1) Fossil of complete body.
(2) Mold.
(3) Cast.
(4) Petrified fossils.
② a. Pine trees secrete resinous matter that changed after its solidification into amber.
b. Small organisms [like insects].
c. Because it preserves them in a medium which protects them from decomposition.
③ ***Look at the main book on page (170).***
④ a. More than 35 million years.
b. They are fossils because they give us details about the life of an old plant.
c. They were formed by replacing the organic matter of wood by minerals part by part.
⑤ ***Look at the main book on page (174).***
⑥ a. Birds and mammals.
b. Amphibians.
c. Archaeopteryx.

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⑦ He can conclude that the conditions in this exploratory well are suitable for petroleum formation.

⑧ a. They indicate that the environment where they lived was a hot and rainy tropical environment.

b. They indicate that the environment where they lived was a clear warm shallow seas.

c. They are found in the limestone rocks of El-Mokattam mountain and indicate that there was a sea floor in this area more than 35 million years ago.

⑨ Trilobite – Cast fossil of fish – Crocodiles – Mammoth.

⑩ a, b, c and d : Mold
e : Cast

15 ① fig. (a) : Remains of a dinosaur's skull – Remains fossil.
fig. (b) : Traces of worms' tunnels – Trace fossil.
fig. (c) : Shell fossil – Cast fossil.
fig. (d) : Amber fossil – Complete body fossil.
fig. (e) : Ammonites fossil – Solid mold fossil.
fig. (f) : Dinosaur's foot print – Trace fossil.

② 1. fig. (a) : Fossil of ferns cast.
fig. (c) : Fossil of trilobite mold.
2. fig. (b) and (c) : are fossils of solid mold.
3. a hot and rainy tropical environment.

③ 1. fig. (a) : Coral fossil.
fig. (b) : Radiolaria fossil.
fig. (c) : Nummulites fossil.
2. (a) indicates that the area was clear warm shallow seas.
(b) indicates that the area has the suitable conditions of petroleum formation and this fossil indicates the age of rocks existed in exploratory wells.
(c) indicates that the area was a sea floor more than 35 million years ago.
3. It is found in the limestone rocks of El-Mokattam mountain.

16 From the suggested answers :
ice cubes mold, cake mold, jelly mold, ...

Thinking Skills Questions

① 1. (B) 2. (B)

② No, as scientists discover petrified fossil of dinosaur's eggs, so they are not mammals

③ Because trilobite considered from invertebrates which preceeds mammals in life.

④ Earth worm - shark - frog - snake - horse.

⑤ As fossils found only between the sedimentary rocks.

Lesson 2

1

1. b	2. a	3. d	4. d	5. d
6. c	7. d	8. a	9. b	10. c
11. c	12. b	13. b	14. d	15. b

2 1. d 2. a 3. b 4. e

3 1. c-B 2. e-C 3. b-A 4. a-E

4 1. (✗) Fossils ..... 2. (✓)
3. (✗) ..... an endangered plant.
4. (✓) 5. (✓) 6. (✓)
7. (✗) ..... USA.

5 1. ..... is one of the causes of the extinction in recent ages.
2. ..... is a simple ecosystem which is strongly affected by the absence of one of its species.
3. ..... reduced size wings.
4. Bald eagle .....

6

1. Extinction.	2. Dodo bird.
3. Quagga.	4. Bald eagle.
5. Papyrus plant.	6. Simple ecosystem.
7. Complicated ecosystem.	
8. Food chain.	9. Food web.
10. Natural protectorates.	
11. Yellowstone protectorate.	
12. Ras Mohamed protectorate.	
13. Wadi El-Hetan.	

7 1. the same species – compensation – die out.
2. Fossils
3. Meteorite impacts with the Earth – exposure of the Earth to long ice age
4. Destroying natural habitat – overhunting – environmental pollution

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5. dinosaur – mammoth.
6. Dodo bird – quagga
7. horse – zebra.
8. Bald eagle – ibis bird – rhinoceros – panda bear
9. Papyrus plant – writing paper.
10. energy – food
11. Desert – tropical forest
12. Establishing natural protectorate areas – establishing gene banks for the much endangered species
13. Natural protectorate
14. Yellowstone protectorate – panda protectorate
15. Yellowstone protectorate – grey bear.
16. Ras Mohamed
17. Wadi El-Hetan

8

1. Due to : - Meteorite impacts with the Earth.
   - The violent Earth movement.
   - Exposure of the Earth to long ice age.
   - Toxic gases which evolved from volcanoes.
2. Due to : - Destroying natural habitat.
   - Overhunting.
   - Environmental pollution.
   - Climatic changes and natural disasters.
3. Due to the reduced size of its wings, so it is a non-flying bird.
4. Because its head is covered with white feathers which make it looks like bald.
5. & 6. Due to the rarity of alternative that compensates the absence of this species.
7. Because it is a system containing a large number of members of living organisms and it is not affected by the absence of any species.
8. & 9. To protect the rare and endangered living organisms.
10. To protect endangered living organisms in their homeland.
11. Because it protects grey bear from the danger of extinction.
12. Because it contains rare species of coral reefs and coloured fish.
13. Because it contains complete whales' fossils 40 million years ago.

9

1. It is the continuous decrease without compensation in the number of a certain species of living organisms until all members of species die out.
2. It is a path of energy that transfers from a living organism to another in the ecosystem.
3. It is a group of food chains connected with each other.
4. It is an ecosystem that has a few members and it is strongly affected by the absence of one of its species.
5. It is an ecosystem that has multiple members and it is not affected much by the absence of one of its species.
6. They are safe areas established to protect endangered species in their homeland.

10

1. Dodo bird.
2. Ibis bird.
3. Papyrus plant.
4. Desert.
5. Tropical forest.
6. Yellowstone protectorate.

11

1. & 2. Look at the main book on page (193).

12

1. Dodo bird.
2. Quagga.
3. Grey bear.
4. Rare species of coral reefs and coloured fish.
5. Whale.

13

1.

Old extinction	Recent extinction
• Meteorite impacts with Earth. • The violent Earth movements. • Exposure of the Earth to long ice age. • Toxic gases which evolved from volcanoes.	• Destroying natural habitat. • Overhunting. • Environmental pollution. • Climatic changes and natural disasters.

2. ***Look at the main book on page (197).***

14

1. It causes a cavity in the path of energy in this ecosystem that would disturb the ecosystem equilibrium or destroy it.
2. It is strongly affected due to the rarity of alternative that compensates this absence.

15

1. Destroying habitat – Causes of old extinction.
2. Quagga – Endangered species.
3. Bald eagle – Extinct species.
4. Giza pyramids area – Natural protectorates.

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16 ① • Meteorite impacts with the Earth.
• The violent Earth movements.
• Exposure of the Earth to long ice age.
• Toxic gases which evolved from volcanoes.

② *Look at the main book on page (193).*

③ *Look at the main book on page (198).*

④ a. In South Sinai governorate.
b. Because it contains rare species of coral reefs and coloured fish.

⑤ a. In El-Fayoum.
b. The area is Wadi El-Hetan which contains complete whales' fossils.

⑥ a. It contains rare species of coral reefs and coloured fish.
b. It contains complete whales' fossils from 40 million years ago.

⑦ a. It is strongly affected, because of the rarity of alternative that compensates this absence.
b. It is not affected much, because it has many alternatives.

17 ① a. The food chain destroys and its members die.
b. The number of snakes increases leading to disturbance of the ecosystem equilibrium.
c. The number of frogs increases and eat all locusts leading to disturbance of the ecosystem equilibrium.

② a. Fig. (2)
b. Fig. (2), because it is complicated ecosystem which contains a large number of members of living organisms that compensate the absence of any species.

③ a. Mammoth.
b. Mammoth is an extinct animal.
Reasons of extinction :
1. Meteorite impacts with Earth.
2. The violent Earth movements.
3. Exposure of the Earth to long ice age.
4. Toxic gases which evolved from volcanoes.

④ (1) Dodo bird – Extinct.
(2) Rhinoceros – Endangered.
(3) Panda bear – Endangered.

⑤ a. The figure indicates the archaeopteryx.
b. • It indicates the idea of extinction : because it is not found in the recent age.
• It indicates the idea of evolution : because it is the link between reptiles and birds.

Thinking Skills Questions

① 1. d 2. b

② On land, because it can't fly due to the reduced of its wings.

③ a. Green plant.
b. Disturbance of the ecosystem, and number of frog decreased due to absence of locusts (their food) which die due to absence of green plant.

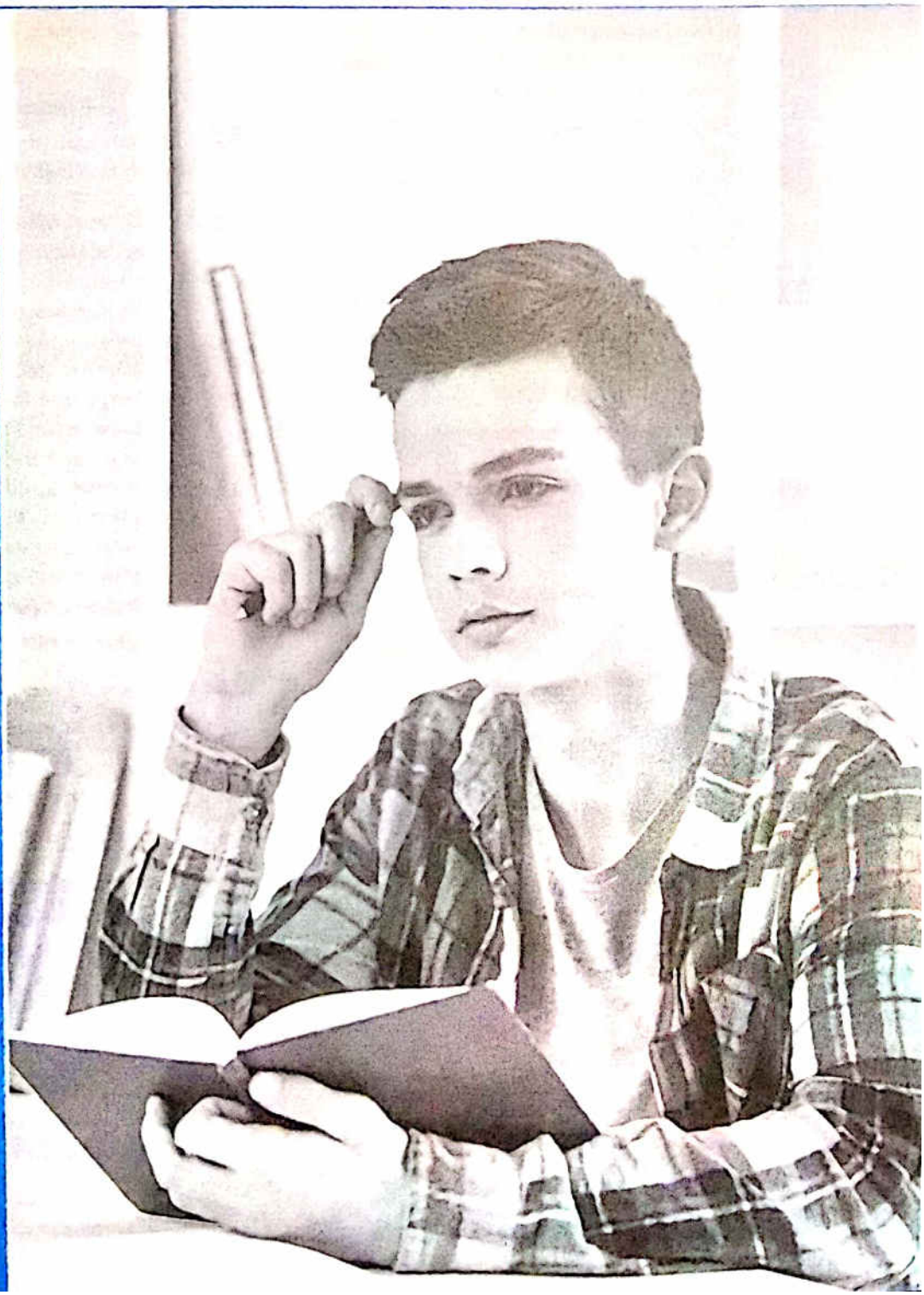
④ (1) a. Some species loss their shelter so, they will be subjected to extinction.
b. O_2 ratio will decrease while the ratio of carbon dioxide gas will increase.
(2) Overcutting trees of forests and environmental pollution.

Project On UNIT THREE *Answer by Yourself*

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PART 2

Guide Answers of Worksheets



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Unit One

Worksheet 1

1 (A) 1. c 2. b 3. a 4. d 5. c 6. b

(B) 1. Mendeleev's periodic table.
2. Moseley's periodic table.
3. Main energy levels.

2 (A) 1. periodically – period.
2. one electron – period.
3. lanthanides – actinides
4. their atomic weights – their atomic numbers.
5. Principles of Chemistry.

(B) *Look at the main book on page (14).*

3 (A) 1. Mendeleev. 2. Moseley. 3. Rutherford.

(B) 1. (✗) ..... in vertical groups.
2. (✓) 3. (✓) 4. (✗) Bohr .....

4 (A) In order to facilitate their study and to find a relationship between elements and their physical and chemical properties.

(B) 1. Modern periodic table 2. (7) 3. (118)

Worksheet 2

1 (A) 1. 92 2. left side – two
3. energy levels 4. (4)
5. 7 – 18

(B) They are arranged ascendingly according to :
– Their atomic numbers.
– The way of filling their energy sublevels with electrons.

2 (A) 1. p-block 2. Transition elements.
3. The atomic number.
4. f-block.

(B) 1. Period (3) and group (1A).
2. Period (3) and group (0).
3. Period (4) and group (2A).
4. Period (2) and group (7A).

(C) 1. ∵ Element (X) lies in the third period and group (1A).
∴ The atomic number of element (X) = 2 + 8 + 1 = 11
2. (15) 3. (8)

3 (A) 1. c 2. b 3. c 4. c
5. b 6. a 7. b 8. b

(B) 1. a. B b. X c. M
2. A : s-block. B : d-block.
D : p-block.
3. c

4 (A) 1. Atomic number = 2 + 6 = 8
2. Atomic number = 2 + 8 + 1 = 11
3. Atomic number = 2 + 8 = 10

(B) 1. (✗) ..... of four blocks of elements.
2. (✗) The group number of .....
3. (✓)

(C) Because their atoms have the same number of electrons in the outermost energy level.

Worksheet 3

1 1. Electronegativity 2. water
3. top right – bottom left 4. ammonia.

2 (A) 1. Because by increasing the atomic number in the same period, the attraction force between the positive nucleus and the negative electrons in the outermost energy levels increases.
2. Due to the increase of the number of energy levels occupied by electrons.
3. Because the difference in electronegativity between its elements is relatively high.
4. Because the difference in electronegativity between oxygen and hydrogen in water molecule is greater than the difference between nitrogen and hydrogen in ammonia molecule.

(B) The atomic size decreases.

3 (A) *Answer by yourself.*

(B) *Look at the main book on page (41).*

4 (A) 1. Picometre. 2. Polar compounds.

(B) 1. (✓)
2. (✗) ..... of a metre.

Worksheet 4

1 (A) 1. Metals. 2. Negative ion. 3. Fluorine.

(B) 1. less 2. an inert gas.
3. increases 4. Cesium

2 1. lose – positive ions – electrons.
2. metalloid – metals – nonmetals.
3. decreases – increases. 4. bottom – top
5. a strong metallic

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3 (A) 1. c 2. d 3. b 4. a 5. d

(B) Because it has the largest atomic size, so it tend to lose its valency electron easily.

4 (A) 1. Elements which have more than 4 electrons in their outermost energy levels.

2. An atom of a metallic element which loses one electron or more during the chemical reaction.

3. Elements which have the properties of both metals and nonmetals.

(B) 1. a. Fig. (A) b. Fig. (B)

2. Period (3) and group (2A).

Worksheet 5

1 (A) 1. $Mg + 2HCl \xrightarrow{dil.} MgCl_2 + H_2\uparrow$

2. $2Mg + O_2 \xrightarrow{\Delta} 2MgO$

$MgO + H_2O \longrightarrow Mg(OH)_2$

3. $C + O_2 \xrightarrow{\Delta} CO_2$

(B)

	Copper	Potassium
By adding each of them to water :	It doesn't react with water.	It reacts instantly with water and hydrogen gas evolves which burns with a pop sound.

2 (A) 1. It is the arrangement of metals in a descending order according to the degree of their chemical activity.

2. They are nonmetal oxides which dissolve in water forming acidic solutions.

(B) 1. b 2. d 3. b 4. d

3 (A) 1. alkaline solutions – blue.

2. hydrogen – burns – pop

3. Zinc – iron

4. magnesium hydroxide – carbonic acid.

5. metals – nonmetals

6. $CO_2 + H_2O \longrightarrow H_2CO_3$

7. $Zn + H_2SO_4 \xrightarrow{dil.} ZnSO_4 + H_2\uparrow$

(B) *Look at the main book on page (55).*

4 (A) 1. (a) carbon dioxide (CO_2).

(b) carbonic acid (H_2CO_3).

2. It turns litmus solution into red.

(B) 1. Magnesium strip burns with a bright light and changes into powder magnesium oxide.

2. The solution turns into red.

3. Alkaline solution of magnesium hydroxide is produced.

Worksheet 6

1 (A) 1. a 2. d 3. d 4. b 5. a

(B) 1. Because he predicted the discovery of new elements and determined the values of their atomic weights.

2. Because it is a nonmetal oxide which dissolves in water forming acidic solution which turns litmus solution into red.

2 (A) 1. Rutherford 2. cesium – fluorine

3. Copper – silver

(B) 1. Period (2) and zero group

2. Period (2) and group (3A).

3. Period (3) and group (4A).

4. Period (2) and group (4A).

3 (A) 1. (✗) ..... right side .....

2. (✓)

3. (✗) ..... a basic oxide.

(B) 1. It gives nonmetal oxide (acidic oxide) as follows $C + O_2 \xrightarrow{\Delta} CO_2$

2. It changes into a positive ion.

4 (A) 1. (19) 2. (9) 3. (15)

(B) 1. Water. 2. Carbon.

3. Silicon. 4. Potassium.

5. Silver. 6. Magnesium oxide.

7. Carbon dioxide.

Worksheet 7

1 (A) 1. Alkali metals group.

2. Kerosene.

(B) 1. c 2. d 3. c 4. a 5. b

2 1. Because they react with water forming alkaline solutions.

2. To prevent it from the reaction with moist air, as it is an active metal.

3. Because their densities are more than water density.

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4. Because potassium is more active than sodium, as its atomic size is larger than that of sodium.

3 1. floats – smaller 2. lose – positive – one
3. potassium hydroxide (KOH) – hydrogen
4. atomic size

4 1. C 2. E 3. A , B & C 4. A

Worksheet 8

1 (A) 1. (7A). 2. Fluorine – chlorine
3. radioactive cobalt 60
4. electronic devices – preservation of cornea.

(B) 1. Bromine.
2. Gamma rays.

2 (A) 1. Y 2. Z 3. X & Y

(B) 1. In transferring heat from inside the nuclear reactor to outside, to be used to obtain the vapour energy required to generate electricity
2. In food preservation.

3 (A) 1. (✓) 2. (✓)
3. (✖) Iodine is .....

(B) 1. Because they are active elements.
2. Because they react with metals forming salts.
3. Due to its low boiling point (–196°C).

4 (A) 1. No reaction.
2. $Cl_2 + 2KI \longrightarrow 2KCl + I_2$
3. $2K + Br_2 \longrightarrow 2KBr$

(B) 1. Potassium – Halogens.
2. Sodium – Gaseous elements.

Worksheet 9

1 (A) 1. Cobalt 60 2. salts formation.
3. $CO_2 - SO_2$ 4. group

(B) 1. Silicon. 2. Iodine.

2 (A) 1. preservation of cornea of the eye.
2. diatomic 3. d-block

(B) 1. Because the atomic size of potassium is larger than that of sodium.
2. Because iodine is less active than bromine.

3 (A) 1. SO_2 2. Iodine.
3. Sulphur.

(B) 1. Atomic size decreases.
2. It sinks in paraffin oil.

4 (A) 1. b 2. a 3. c 4. c 5. d

(B) 1. a. Period (3) and group (2A).
b. s-block.

2. a. ∵ The atomic number of element (X) = 2 + 8 + 2 = 12
∴ The atomic number of element (Y) = 2 + 8 + 3 = 13

b. ∵ Element (X) locates in period (3) and group (2A).
∴ Element (Z) locates in period (4) and group (2A).
∴ The atomic number of element (Z) = 2 + 8 + 8 + 2 = 20

Worksheet 10

1 (A) 1. d 2. b

(B) ***Answer by yourself.***

2 (A) 1. polar – ionic 2. solid – liquid
3. two hydrogen – one oxygen
4. hydrogen 5. hydrogen bond.

(B) It is a type of weak electrostatic attraction that originates between the molecules of some polar compounds.

3 (A) The molecules of water are collected together by hydrogen bonds forming large-sized hexagonal ice crystals with many spaces between them, so its volume increases and thus its density decreases.

(B) 1. (✖) Oil and sugar are .....
2. (✓) 3. (✓)

4 (A) 1. Single covalent bond.
2. Hydrogen bond. 3. Anode.

(B) 1. Because its density is less than water density.
2. To make water conduct electricity, where pure water is a bad conductor of electricity.
3. Because on freezing, the volume of water increases.
4. Because sugar molecules can form hydrogen bonds with water molecules.
5. Because it has a neutral effect.

(C) 1. Hofmann's voltameter.

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2. (1) Acidified water
(Water + Drops of dil.H_2SO_4).
(2) Oxygen gas.
(3) Hydrogen gas.

3. * Above the anode, it glows more.
* Above the cathode, it burns with a pop sound.

4. $2H_2O \xrightarrow{\text{Electrolysis}} 2H_2\uparrow + O_2\uparrow$

5. Volume of the gas at the anode = $\frac{20}{2}$
= 10 cm^3

Worksheet 11

1 1. Plastic reacts with chlorine gas which is used as water disinfectant leading to the increase in the infection rates of cancer.
2. It causes biological water pollution which causes the infection with many diseases such as bilharzia, typhoid and hepatitis.

2 1. bilharzia – typhoid – hepatitis.
2. blindness – liver cancer.
3. disinfect – plastic 4. death of brain cells.
5. radiant – thermal

3 (A) 1. ***Look at the main book on page (97).***
2. ***Look at the main book on page (98).***
(B) 1. Biological water pollution.
2. Chemical water pollution. 3. Lead.

4 (A) It is the addition of any substance to the water which causes continuous gradual change in water properties affecting the health and the life of living creatures.
(B) 1. (✗) ..... from natural environmental pollutants.
2. (✓)
3. (✗) ..... infection with cancer.

General Exercise of the School Book on Unit One

1 1. a 2. d 3. d 4. b

2 1. It is the arrangement of metals in a descending order according to the degree of their chemical activity.
2. It is the addition of any substance to the water which causes continuous gradual change in water properties affecting the health and life of living creatures.
3. They are the elements which have the properties of both metals and nonmetals.

3 – By adding some water and drops of litmus solution to each of them :
• In case of magnesium oxide, the litmus solution turns into blue.
• In case of sulphur oxide, the litmus solution turns into red.

4 1. It is used in preservation of cornea of the eye, due to the decrease of its boiling point (–196°C).
2. It is used in transferring heat from inside the nuclear reactor to outside, to be used to obtain the vapour energy required to generate electricity.
3. It is used in agricultural fields, industrial fields and personal fields.

5 1. Because it emits gamma rays which prevent the reproduction of microbial cells without an effect on human.
2. Because their atoms have the same number of electrons in the outermost energy level.
3. Due to the presence of hydrogen bonds between water molecules.
4. To prevent them from the reaction with moist air as they are active metals.

6 1. This leads to chemical water pollution.
2. This leads to thermal water pollution which causes death of marine creatures exist in water.
3. This leads to biological water pollution.

Model Exam 1 on Unit One

1 (A) 1. c 2. a 3. c 4. d

(B) 1.

N	O	F
70	66	64
P	S	Cl
110	104	99

2. Picometre.

(C) 18

2 (A) 1. bad 2. anode 3. Rutherford
4. Cobalt 60

(B) 1. Chemical activity series.
2. Hydrogen bonds.
3. f-block. 4. Water.

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(C) Because when the temperature of water is less than 4°C, the molecules of water are collected together by hydrogen bonds forming large-sized hexagonal ice crystals with many spaces between them, so its volume increases and thus its density decreases.

3 (A) 1. sodium – heat
2. acidic solutions – alkaline solutions.
3. thermal – radiant
4. Sulphur – phosphorus

(B) 1. c 2. d 3. a 4. b

(C) Silicon – Cobalt 60

4 (A) 1. (✗) 2. (✓) 3. (✗) 4. (✓)

(B) 1. Radiant water pollution occurs.
2. No reaction takes place.

(C) Due to the pollution of the river water as a result of :
- Dumping the factories wastes in it.
- Leakage of chemical pesticides that reach it from the soil with sewage.

Model Exam 2 on Unit One

1 (A) 1. (7)
2. Chlorine – fluorine – bromine
3. $Mg + 2HCl \xrightarrow{dil.} MgCl_2 + H_2\uparrow$
4. Anode – cathode

(B) 1. $Mg + 2HCl \xrightarrow{dil.} MgCl_2 + H_2\uparrow$
2. $C + O_2 \xrightarrow{\Delta} CO_2$

(C) It changes into a positive ion.

2 (A) 1. (✓) 2. (✓) 3. (✓) 4. (✗)

(B) 1. Because it causes the death of brain cells.
2. Because their atoms have the same number of energy levels occupied by electrons, which are 2 energy levels.

(C) Chlorine : Gaseous state.
Bromine : Liquid state.

3 (A) 1. d 2. b 3. c 4. b

(B) 1. third period. 2. s-block.
3. An alkali metal. 4. neon.

(C) *Answer by yourself.*

4 (A) 1. lithium. 2. NaCl.
3. acidic oxide. 4. gas.

(B) *Answer by yourself.*

(C) 9 – Nonmetal.

Unit Two

Worksheet 12

1 (A) 1. a 2. b 3. a 4. c 5. b 6. b

(B) - Height in kilometres
= 8862 ÷ 1000 = 8.862 km
- The amount of decrease in temp.
= height (km) × 6.5
= 8.862 × 6.5 = 57.6°C
- Temp. at the top of Everest mountain
= temp. at the foot – the amount of decrease in temp.
= 20.6 – 57.6 = –37°C

2 1. Because it contains about 75% of the mass of atmospheric envelope.
2. Because it contains 99% of the total amount of atmospheric water vapour.
3. Due to decreasing the height of air column.
4. Because the hot air currents (less density) move upwards, while the cold air currents (high density) move downwards.

3 1. 13 km. 2. decreases – 6.5°C
3. troposphere layer. 4. 75% – 99%
5. determine the possible day weather.
6. altimeter

4 (A) 1. *Look at the main book on pages (114 & 115).*
2. *Answer by yourself.*

(B) 1. Troposphere – Stratosphere – Mesosphere – Thermosphere.
2. Thermosphere – Mesosphere – Stratosphere – Troposphere.

(C) 1. (✓) 2. (✗) ..... 1013.25 mbar.
3. (✓)

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Worksheet 13

1 **(A)** 1. 37 km – 35 km.
2. meteors – air molecules.
3. thermosphere – mesosphere.
4. stratosphere 5. ionosphere.

(B) 1. It is a phenomenon appears as brightly coloured light curtains seen from the both north and south poles of the Earth.
2. They are two magnetic belts surrounding ionosphere.
3. It is a region in which the atmospheric envelope is inserted in outer space.
4. It is a layer that contains charged ions which present in the upper part of thermosphere and extends up to 700 km above sea level.

(C) The cosmic radiations are scattered which lead to the occurrence of Aurora phenomenon.

2 **(A)** (a) Troposphere. (b) Tropopause.
(c) Stratosphere. (d) Stratopause.
(e) Mesosphere. (f) Thermosphere.

(B) 1. (✓) 2. (✓)
3. (✗) Ionosphere .....
4. (✗) ..... stratosphere layer.

(C) 1. ***Answer by yourself.***
2. ***Look at the main book on page (126).***

3 **(A)** 1. Because in this part, the air motion is horizontally and neither clouds nor weather turbulences exist.
2. Because it reflects radio waves transmitted by radio stations and communication centres.
3. This is due to the absorption of ultraviolet rays (emitted from the Sun) by ozone layer, which is present at its upper part.
4. Because it contains most of ozone gas (O_3) which is found in atmospheric envelope.
5. Because it contains charged ions.

(B) ***Answer by yourself.***

4 **(A)** 1. It absorbs harmful far ultraviolet radiations emitted from the Sun.
2. They are used to transmit weather conditions information and TV programs.
3. It contains ionosphere which is important in wireless communications.

(B) 1. b 2. b 3. d 4. a 5. a

Worksheet 14

1 1. (✓) 2. (✗) 3. (✗) 4. (✓)

2 1. Far ultraviolet radiations. 2. Ozone hole.
3. Ozone gas. 4. Dobson.

3 **(A)** $O_2 \xrightarrow{UV} O + O$ $O + O_2 \longrightarrow O_3$

(B) 1. This means that the normal atmospheric pressure is 1013.25 mbar at 0°C temperature.
2. ***Look at the main book on page (143).***

4 **(A)** 1. ultraviolet 2. near ultraviolet rays.
3. 1×10^{-9} 4. September – south

(B) 1. Due to increasing the amount of pollutants which are emitted at this time every year.
2. Because stratosphere layer is the first layer in the atmospheric envelope which contains suitable amount of oxygen gas, faces ultraviolet radiations emitted from the Sun.

Worksheet 15

1 1. • Fossil fuel burning. • Cutting trees.
• Forests fires.
2. They are used in fires extinguishing.

2 **(A)** The Intergovernmental Panel on Climate Changes.

(B) 1. a 2. b 3. c

3 **(A)** 1. (1) Near ultraviolet rays.
(2) Medium ultraviolet rays.
(3) Far ultraviolet rays.
2. 20 km.

(B) Erosion of ozone layer increases, and also the temperature of the planet Earth increases.

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4 (A) 1. (✗) Halons are ..... 2. (✓)
3. (✗) Nitrogen oxides .....

(B) *Look at the main book on pages (145 & 146).*

Worksheet 16

1 (A) 1. Tropical hurricanes, destroying floods, drought waves and forest fires take place.
2. Disappearance of some coastal areas.
3. Erosion of ozone layer increases.
4. Occurrence of greenhouse effect phenomenon which causes the increase in the planet Earth's temperature.

(B) It is the trapping of infrared radiation in the troposphere layer due to the increase in the percentage of greenhouse gases which cause the increase in the planet Earth's temperature.

2 1. Forests fires – drought waves
2. chemical – thermal
3. visible light – short-waved
4. the continuous increase in the average temperature of the Earth's near-surface air.

3 (A) 1. Due to global warming phenomenon.
2. Because it has a long wavelength.
3. To prevent increasing the percentage of CO_2 gas which increases the temperature of planet Earth.
4. Due to fossil fuel burning, cutting trees and forests fires.

(B) 1. a 2. a 3. d 4. d
5. a 6. b

General Exercise of the School Book on Unit Two

1 1. Stratopause. 2. Ionosphere. 3. CO_2
4. Far ultraviolet rays.

2 1. thermosphere – mesosphere.
2. troposphere – exosphere
3. chemical – thermal
4. chlorofluorocarbon – halons.

3 *Look at the main book on page (142).*

4 - At the lower part of stratosphere layer.
- Because at its beginning the atmospheric pressure is 100 mbar and it decreases as we go up until it becomes 1 mbar at its top.

5 *Look at the main book on page (128).*

6 The amount of change in temperature
= temperature at its foot – temperature at its top
= 30 – (– 6)
= 36°C
∴ Height of mountain = $\frac{\text{Change in temperature}}{6.5°C}$
= $\frac{36}{6.5}$ = 5.53 km.

Model Exam 1 on Unit Two

1 (A) 1. c 2. c 3. b 4. d

(B) 1. Mesosphere 2. mesosphere
3. Halons 4. Infrared

(C) - The amount of increase in temp. (the middle of the mountain : A) = 1 × 6.5 = 6.5°C
∴ The temperature at point (A) = zero + 6.5
= 6.5°C
- The amount of decrease in temp. (the middle of the mountain : B) = 1 × 6.5
= 6.5°C
∴ The temperature at point (B)
= zero – 6.5 = – 6.5°C
- The amount of increase in temp. (A : C) = 0.5 × 6.5 = 3.25°C
∴ The temperature at point (C)
= 6.5 + 3.25 = 9.75°C

2 (A) 1. (✓) 2. (✗) 3. (✗) 4. (✗)

(B) 1. Because they scatter the harmful charged cosmic radiations away from the Earth before entering the ionosphere layer.
2. Because it contains charged ions.

(C) It is the coutinuous increase in the average temperature of the Earth's near – surface air.

3 (A) 1. Fossil fuel burning – cutting trees
2. high – low
3. troposphere – stratosphere
4. Thermosphere – the thermal

(B) 1. The atmospheric pressure decreases.
2. Ozone molecule is formed.

(C) *Answer by yourself.*

4 (A) 1. Ionosphere layer. 2. Aurora phenomenon
3. Exosphere. 4. Greenhouse effect.

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(B) 1. Oxygen – Greenhouse gases.
2. Water vapour – Pollutants of ozone layer.
3. Greenhouse effect – Severe climatic changes.
4. Thermosphere – Regions between atmospheric layers.

(C) The temperature of stratosphere will decrease because the ultraviolet rays will not be absorbed, and the temperature of troposphere will increase because the amount of ultraviolet rays which pass through it will increase.

Model Exam 2 on Unit Two

1 (A) 1. Carbon dioxide (CO_2) – methane gas (CH_4)
2. Medium ultraviolet rays – near ultraviolet rays
3. Dobson – 3 mm. 4. 20 – 40

(B) 1. Methane gas. 2. Altimeter.
3. Methyl bromide gas. 4. Drought waves.

(C)

Troposphere layer	Mesophere layer
- In which, all atmospheric phenomena take place. - It organizes the Earth's temperature.	It protects the planet Earth from celestial rocky masses that enter the atmospheric envelope, where some of them burn completely forming meteors.

2 (A) 1. c 2. c 3. a 4. d

(B) 1. Far ultraviolet rays. 2. Aneroid.
3. Atmospheric pressure. 4. Isobar.

(C) Because it contains most of ozone gas (O_3) , which is formed in atmospheric envelope.

3 (A) 1. greenhouse gases. 2. carbon dioxide
3. 35 km. 4. Ionosphere

(B) 1. The harmful charged cosmic radiations will reach the surface of the Earth which threaten the life of living organisms.
2. Erosion of ozone layer increases, and also the temperature of the Earth increases.

(C) 1. The amount of change in temp. from the middle of the mountain to its top
= 9 – (– 4) = 13°C
- The distance between the middle of the mountain and its top = $\frac{13}{6.5}$ = 2 km.
- The height of the mountain = 2 + 2 = 4 km.
2. The amount of increase in temp. from the top of the mountain to its foot = 4 × 6.5
= 26°C
- The temp. at the foot = temp. at the top + the amount of increase in temp. = – 4 + 26
= 22°C

4 (A) 1. (✗) 2. (✓) 3. (✗) 4. (✗)

(B) 1. b 2. d 3. a 4. c

(C) - By increasing the height above sea level, the temperature decreases.
- Diagram (b)

Unit Three

Worksheet 17

1 1. c 2. d 3. c 4. c

2 (A) 1.

Mammoth fossil	Amber fossil
Burying of mammoth after death immediately in snow which preserved it from decomposition.	Immersing insects in resinous matter (that was secreted by pine trees) which solidified and preserved the bodies of these insects inside it from decomposition.

2.

Cast	Mold
It is the replica of the external details of the structure of an old living organism left after its death in sedimentary rocks. Ex. : Fish fossil.	It is the replica of the internal details of the structure of an old living organism left after its death in sedimentary rocks. Ex. : Trilobite fossil.

(B) 1. Mammoth fossil.
2. *Look at the main book on page (174).*
3. Worm's tunnels.

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3 **(A)** Fig. (1) Shell fossil – Cast fossil.
Fig. (2) Ammonites fossil – Solid mold fossil.
Fig. (3) Remains of a dinosaur's skull – Remains fossil.

(B) 1. It is the solidified resinous matter which was secreted by pine trees in old geological ages.
2. It is the process of conversion of the parts of old living organisms to rocky materials as a result of replacing the organic material of the organism with minerals, part by part.
3. They are traces and remains of old living organisms that are preserved in sedimentary rocks.

4 **(A)** 1. Because they give us the details about the life of an old plant.
2. Because it contains petrified woods which look like rocks.
3. Because it preserves the bodies of insects inside it from decomposition.

(B) 1. snow. 2. last – whole shape.
3. a solid mold – internal
4. pine trees 5. sedimentary

Worksheet 18

1 **(A)** 1. age – petroleum 2. reptiles – birds.
3. life evolution – paleoenvironment.
4. Nummulites – limestone

(B) They are fossils of organisms that had lived for a short period of time in the past and had a wide geographical range, then became extinct.

2 1. fossils. 2. Index 3. Coral
4. a hot and rainy tropical environment.
5. during its life 6. traces

3 **(A)** 1. Because the presence of them in the rocks of the exploratory wells indicate the suitable conditions of petroleum formation.
2. Due to the presence of nummulites fossils in the limestone rocks of El-Mokattam mountain.

(B) 1. They indicate the age of sedimentary rocks in which they are found.
2. ***Look at the main book on page (174).***

4 **(A)** 1. b 2. c 3. c 4. c
(B) 1. d 2. a 3. b 4. c

Worksheet 19

1 **(A)** 1. Overhunting 2. Mammoth
3. Quagga 4. Dodo bird

(B) It is the continuous decrease without compensation in the number of a certain species of living organisms until all members of species die out.

2 **(A)** • Meteorite impacts with Earth.
• The violent Earth movements.
• Exposure of the Earth to long ice age.
• Toxic gases which evolved from volcanoes.

(B) (1) Panda bear – Endangered species.
(2) Dodo bird – Extinct species.
(3) Rhinoceros – Endangered species.
(4) Ibis bird – Endangered species.

3 **(A)** 1. Papyrus plant – writing paper.
2. Ibis bird – rhinoceros.
3. Dodo bird – quagga
4. dinosaur – mammoth.

(B) 1. (a) Bald eagle. (b) Dodo bird.
2. (a) Endangered. (b) Extinct.

4 **(A)** Due to the reduced size of its wings, so it is a non-flying bird.

(B) ***Answer by yourself.***

Worksheet 20

1 **(A)** ***Look at the main book on page (198).***

(B) 1. Because it has many alternatives.
2. Because it contains a few number of members and it is strongly affected by the absence of one of its species.

2

Complicated ecosystem	Simple ecosystem
It is an ecosystem has multiple members and it is not affected much by the absence of one of its species.	It is an ecosystem has a few members and it is strongly affected by the absence of one of its species.

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3 (A) (1) Ras Mohamed protectorate – Rare species of coral reefs and coloured fish.
(2) Northeastern China – Panda bear
(3) Yellowstone protectorate – USA

(B) 1. (✗) 2. (✓) 3. (✗)

4 (A) 1. They are safe areas established to protect endangered species in their homeland.
2. It is a path of energy that transfers from a living organism to another in the ecosystem.

(B) 1. d 2. c 3. f
4. a 5. e

General Exercise of the School Book on Unit Three

1 1. b 2. c 3. d

2 1. They are traces and remains of old living organisms that are preserved in sedimentary rocks.
2. They are fossils of organisms that had lived in a short period of time in the past and had a wide geographic distribution, then became extinct.
3. They are safe areas established to protect endangered species in their homeland.

3 1. ... preserved in snow.
2. ... in a hot and rainy tropical environment.
3. ... is one of the causes of recent extinction.

4 *Look at the main book on page (198).*

5 1. Because they give us the details about the life of an old plant.
2. Because the presence of foraminifera and radiolaria in the rocks of the exploratory wells indicate the suitable conditions of petroleum formation.
3. Due to the rarity of alternative that compensates the absence of this species.

6 1 , 2 , 3 & 4 Mold.
5 : Cast

Model Exam 1 on Unit Three

1 (A) 1. a 2. c 3. d 4. d

(B) 1. Quagga 2. snow.
3. fish. 4. endangered

(C) 1. Big fish die due to starvation and the number of crustaceans will increase which pounce on the algae so, the equilibrium of the ecosystem will disturb.
2. Simple ecosystem.

2 (A) 1. (✓) 2. (✗) 3. (✗) 4. (✗)

(B) 1. Because it is a suitable medium which preserves body from decomposition.
2. Because it protects panda bear from the danger of extinction.

(C) Recent extinction occurred now is caused by different factors. Most of them are due to the interference of man with nature such as :
1. Destroying natural habitat.
2. Overhunting.
3. Environmental pollution.
4. Climatic changes and natural disasters.

3 (A) 1. Papyrus – endangered
2. Minerals – petrified
3. Dodo bird – quagga 4. mosses – ferns.

(B) 1. A complete body fossil of it is formed.
2. It changes into petrified wood.

(C) They are traces and remains of old living organisms that are preserved in sedimentary rocks.

4 (A) 1. Extinction. 2. Natural protectorates.
3. Index fossils. 4. Solid mold fossil.

(B) 1. Because the oldest layer is on the bottom and the most recently layer is on the top so, the fossil found in layer (A) (top layer) would be the newest.
2. Sedimentary – because fossils are preserved in sedimentary rocks.

(C) 1. Establishing gene banks for the endangered species.
2. Establishing natural protectorate areas.
3. Putting laws which regulate the process of hunting of living organisms especially the rare types.

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Model Exam 2 on Unit Three

1 **(A)** 1. Yellowstone protectorate – grey bear.
2. Mammoth fossil – amber fossil
3. a few members – strongly affected
4. traces – remains

(B) 1. Desert.
2. Panda protectorate.
3. Nummulites fossil.
4. Dodo bird.

(C) *Look at the main book on page (172).*

2 **(A)** 1. c 2. c 3. d 4. b

(B) 1. The bodies of insects are preserved inside it from decomposition.
2. It is strongly affected due to the rarity of alternative that compensates this absence.

(C) - (A) Foraminifera.
- (B) Radiolaria.
- They indicate that :
  - The age of rocks existed in exploratory wells.
  - The suitable conditions of petroleum formation.

3 **(A)** 1. Panda bear 2. birds and mammals.
3. minerals 4. Quagga

(B) 1. Because the presence of foraminifera and radiolaria in the rocks of the exploratory wells indicate the suitable conditions of petroleum formation.
2. To protect the rare and endangered living organisms.

(C) Traces of an old living organism indicate its activity during its life

4 **(A)** 1. (✗) 2. (✓) 3. (✓) 4. (✗)

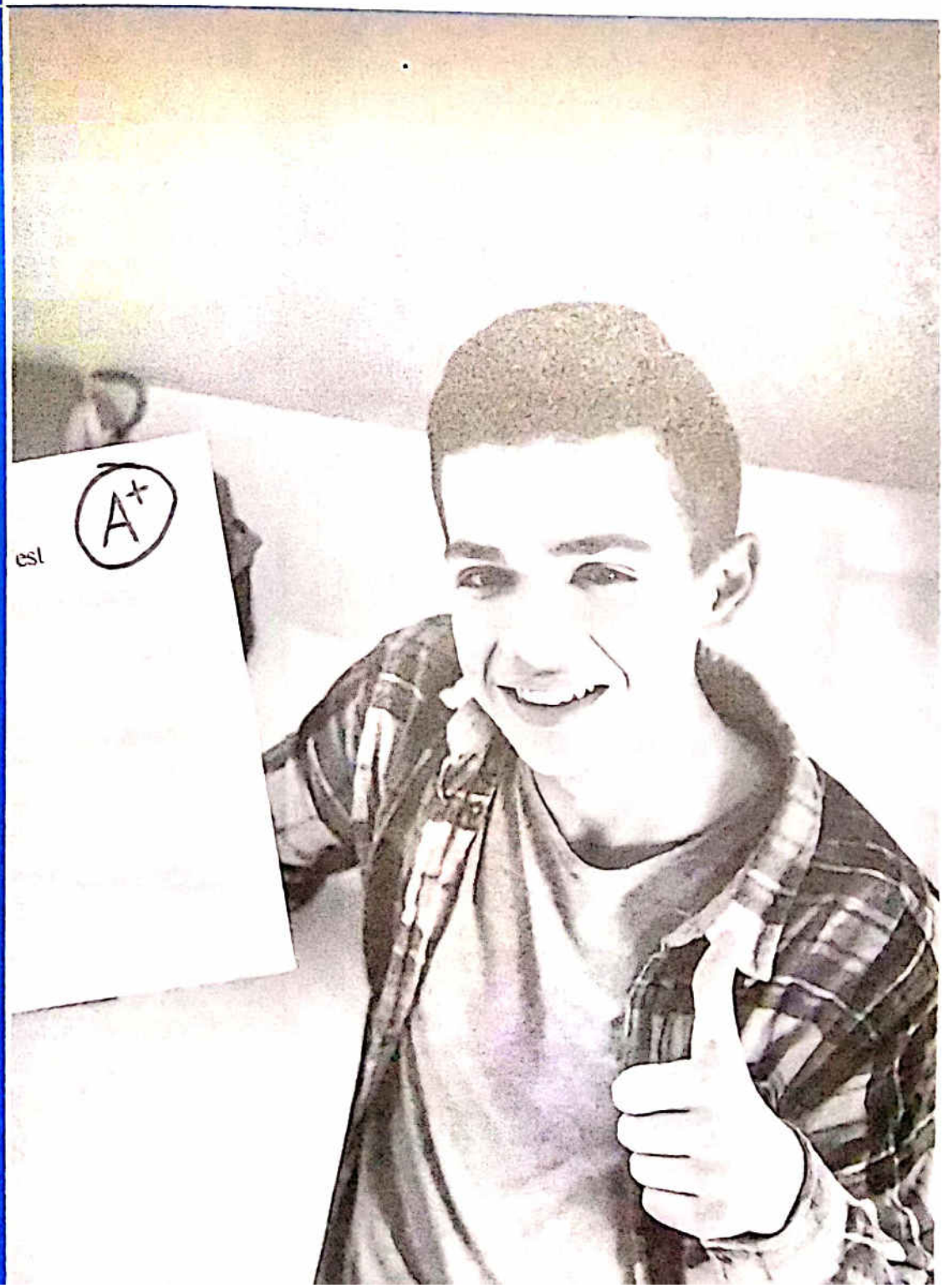
(B) 1. Locust and deer.
2. There will be more frogs, so they will eat more locusts and there will be fewer locusts to eat the grass, so the equilibrium of the ecosystem will disturb.

(C) 1. Ras Mohamed protectorate.
2. Wadi El-Raiyan protectorate.

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PART 3

Guide Answers of Final Examinations



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Cairo Governorate

1 Leaders Language School

1 **(A)** 1. lanthanides – actinides
2. lose – preceding
3. solid – liquid
4. Fish – amphibians

(B) 1. Van-Allen Belts.
2. Methyl bromide gas.
3. Lead.
4. Chemical activity series.

(C) 1. $MgO + H_2O \longrightarrow Mg(OH)_2$
2. $Br_2 + 2\,KI \longrightarrow 2\,KBr + I_2$

2 **(A)** 1. Because after its death, it was rapidly buried in snow which preserved its body from decomposition.
2. Because of the rarity of alternative that compensates this absence.
3. Due to increase fossil fuel burning, cutting trees and forests fires.
4. Because cesium has the largest atomic size, so it can lose its valency electron easily.

(B)

The odd word	The scientific term of the rest
1. Chlorine	- Alkali metals (group 1A).
2. Magnesium	- Metalloids.
3. Water vapour	- Pollutants of ozone layer.
4. Hofmann's voltameter	- Instruments of measuring the atmospheric pressure.

(C) - The amount of decrease in temp.
= height (km) × 6.5
= 3 × 6.5 = 19.5°C
- The temp. at a point of height 3 km
= The temp. at the sea level
– the amount of decrease in temp.
= 30 – 19.5 = 10.5°C

3 **(A)** 1. b 2. a 3. d 4. b

(B) 1. Satellites float in it, are used to transmit weather condition information and TV programs.
2. It is established to protect rare species of coral reefs and coloured fish.
3. Its presence indicates the suitable conditions of petroleum formation.
4. Its presence indicates that the environment where they lived was hot and rainy tropical environment.

(C) 1. The electronic configuration of ($_{19}K$) is (2, 8 , 8 , 1), so it locates in period (4) and group (1A).
2. The electronic configuration of ($_{10}Ne$) is (2 , 8), so it locates in period (2) and group (0).

4 **(A)** 1. A mold fossil is formed.
2. The atomic size increases and the nonmetallic property decreases.
3. Its boiling point will be less than 100°C.
4. Salts will be formed.

(B) 1. (✗) 2. (✗) 3. (✓) 4. (✗)

(C) 1. (37 km) 2. (– 90°C)

2 Manor House International School

1 **(A)** 1. their atomic weight. 2. thermosphere.
3. $Mg(OH)_2$ 4. extinct

(B) 1. Potassium 2. endangered
3. Metalloid 4. troposphere layer.

(C) Water molecules are collected together by hydrogen bonds forming large-sized hexagonal ice crystals with many spaces between them.

2 **(A)** 1. c 2. d 3. a 4. c

(B) 1. (✗) 2. (✓) 3. (✗) 4. (✓)

(C) - The amount of decrease in temp.
= height (km) × 6.5 = 2 × 6.5 = 13°C
- The temp. at the top of a mountain
= the temp. at the sea level
– the amount of decrease in temp.
= 20.6 – 13 = 7.6°C

3 **(A)** 1. Water pollution. 2. Extinction.
3. Altimeter.
4. Radioactive cobalt 60.

(B) 1. Iodine. 2. Mammoth fossil
3. Oil. 4. Cesium.

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(C) 1. The electronic configuration of ($_{13}$Al) is (2 , 8 , 3), so it locates in period (3) and group (3A).

2. The electronic configuration of ($_{10}$Ne) is (2, 8), so it locates in period (2) and group (0).

4 (A) 1. Quagga. 2. Silver. 3. Sugar. 4. Nitrogen.

(B) 1. It acts as a protective shield for living organisms from the harmful chemical effects of ultraviolet radiations.

2. It used in the preservation of cornea of the eye.

3. It is used in water electrolysis.

4. It is used to determine the possible day weather based on the atmospheric pressure.

(C) Because carbon dioxide dissolves in water forming carbonic acid (acidic solution) which turns blue litmus paper into red.

$$CO_2 + H_2O \longrightarrow H_2CO_3$$

3 Heliopolis Modern Language School

1 (A) 1. (7A) – (1A)

2. Mesosphere – thermosphere

3. (2MgO)

4. Quagga – panda bear

(B) 1. Water.

2. Barometer.

3. Papyrus.

4. Bromine.

(C) - The volume of the gas evolved above the anode = $\frac{10}{2} = 5\ cm^3$.

- The gas evolved above the anode is oxygen gas, the gas evolved above the cathode is hydrogen gas.

2 (A)

The odd word	The scientific term of the others
1. $_6$C	- Halogens (group 7A).
2. O_2	- Greenhouse gases.
3. Fossil record	- Types of fossils.
4. Dodo bird	- Endangered species.

(B) 1. (✗) 2. (✓) 3. (✗) 4. (✗)

(C)

	Florine ($_9$F)	Cesium ($_{55}$Cs)
1. Kind	Nonmetal	Alkali metal
2. Atomic size	The smallest atom in the modern periodic table.	The largest atom in the modern periodic table.

3 (A) 1. c 2. c 3. b 4. a

(B) 1. Chemical activity series.

2. Aurora phenomenon. 3. Fossil.

4. Global warming phenomenon.

(C) 1. It reacts instantly with water and hydrogen gas evolves which burns with a pop sound.

2. Harmful cosmic radiations will scattered away from the Earth, which cause the occurrence of Aurora phenomenon.

4 (A) [1] 1. c 2. b 3. e 4. d

[2] 1. c 2. e 3. a 4. b

(B) 1. alkali metals. 2. (19)

3. larger than 4. positive

(C) 1. The electronic configuration of ($_{10}$Ne) is (2 , 8) , so it locates in period (2) and group (0).

2. The electronic configuration of ($_8$O) is (2 , 6), so it locates in period (2) and group (6A).

4 El-Helmia Official Language School

1 (A) 1. chemical – thermal

2. atomic weights – atomic numbers

3. thermosphere – mesosphere

4. alkali metals – halogens

5. cesium – fluorine

(B) 1. It is used in food preservation.

2. It is used in aeroplanes to measure the elevation of navigation based on the atmospheric pressure.

2 (A) 1. Because the lower part of stratosphere layer does not contain clouds or weather disturbances and the air movement is horizontal.

2. Due to the decrease in its boiling point (–196°C).

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3. Because it is strongly affected by the absence of one of its species.
4. To protect endangered species in their homeland.

(B) 1. The electronic configuration of ($_{17}$Cl) is (2 , 8 , 7), so it locates in period (3) and group (7A).
2. The electronic configuration of ($_{18}$Ar) is (2 , 8 , 8), so it locates in period (3) and group (0).

(C)

	Troposphere	Stratosphere
Atmospheric pressure at its top :	100 mbar	1 mbar
Thickness :	13 Km	37 Km

3 **(A)** 1. Hydrogen bonds. 2. Electronegativity.
3. Fossils 4. Ionosphere layer.

(B) It is the weight of air column of an atmospheric height on a unit area ($1m^2$).

(C) 1. $2KCl + Br_2$ 2. $2NaOH + H_2\uparrow$

4 **(A)** 1. c 2. c 3. b 4. b

(B) - The amount of decrease in temp.
= height (Km) × 6.5
= 3 × 6.5 = 19.5°C
- The temp. at the top of the mountain
= the temp. at its foot
– the amount of decrease in temp.
= 27 – 19.5 = 7.5°C

(C) 1. It is not affected much by the absence of one of its species.
2. It causes blindness.

5 St. Joseph School

1 **(A)** 1. Due to the presence of nummulites fossils in the limestone rocks of El-Mokattam mountain.
2. Due to decreasing the length of air column and thus its weight decreases.
3. Because the lower part of stratosphere layer does not contain clouds or weather disturbances and the air movement is horizontal.
4. Because the number of energy levels occupied by electrons increases.

(B) 1. mesosphere 2. 2KCl
3. Ibis bird 4. Silicon

(C) 1. He discovered the main energy levels of the atom.
2. He discovered that the nucleus of the atom contains positively charged protons.

2 **(A)** 1. a 2. b 3. a 4. d

(B) 1. W and Y
2. L and M
3. D , E , F and G
4. B
5. L

(C) 1. Mammoth 2. CO_2

3 **(A)** 1. Atmospheric pressure.
2. Water pollution.
3. Fossils.
4. Isobar.
5. Extinction.

(B) **[1]** 1. $Mg + 2HCl \xrightarrow{dil.} MgCl_2 + H_2\uparrow$
2. $Br_2 + 2KI \longrightarrow 2KBr + I_2$

[2] ***Answer by yourself.***

(C) 1. It acts as a protective shield for living organisms from the harmful chemical effects of ultraviolet radiations.
2. It is used in food preservation.
3. It is used in water electrolysis.
4. Shows that the periodicity of elements properties is related to their atomic numbers and not to their atomic weights as Mendeleev believed.
5. It is very important in wireless communications and broadcasting.

4 **(A)** 1.

P.O.C	Mold	Cast
Definition :	It is the replica of the internal details of the structure of an old living organism left after its death in sedimentary rocks.	It is the replica of the external details of the structure of an old living organism left after its death in sedimentary rocks.
Example :	Trilobite fossil.	Fish cast.

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2.

	Aneroid	Altimeter
Importance :	It is used to determine the possible day weather based on the atmospheric pressure.	It is used in aeroplanes to measure the elevation of navigation based on the atmospheric pressure.

(B) 1. an inert gas. 2. decreases.
3. 300 Dobson. 4. Dodo bird
5. Troposphere

(C) 1. (9) 2. (11) 3. (2)

Giza Governorate

6 Egypt Dream Language School

1 (A) 1. Aneroid – altimeter
2. mesosphere – troposphere
3. decreases – increases.
4. Bald eagle – panda bear

(B) 1. Water pollution. 2. Greenhouse effect.
3. Extinction. 4. Ozone hole.

(C) - The amount of decrease in temp.
= height (km) × 6.5 = 10 × 6.5 = 65°C
- The temp. at a point of height 10 km
= the temp. at the sea level
– the amount of decreases of temp.
= 24 – 65 = – 41°C

2 (A) 1. b 2. c 3. b 4. c

(B) 1. Element ($_2$X) is located in period (1) and group (0), element ($_9$Y) is located in period (2) and group (7A), element ($_{12}$Z) is located in period (3) and group (2A).
2. The atomic number of the element, which follows element (Z) in the same group
= 2 + 8 + 8 + 2 = 20

(C) 1. CO_2 2. Desert.

3 (A) 1. Because the temp. in the troposphere layer decreases at a rate (6.5°C) for each (1Km) height.
2. Because nitrogen oxides which is one of ozone layer pollutants, are produced from the burning of fuel of concorde aeroplanes.
3. Because it cannot form hydrogen bonds with water.
4. Because it contains complete whales' skeleton fossil (40 million years ago).

(B) 1. 104.5° 2. 20 to 40 Km
3. stratosphere 4. H_2

(C) 1. It is the arrangement of metals in a descending order according to the degree of their chemical activity.
2. It is a group of food chains connected with each other.

4 (A) 1. chemical – thermal 2. left – 1A – 2A
3. monovalent. 4. Liquid – solid

(B) 1. CO_2 2. C
3. Fossil record. 4. water vapour

(C) 1. Harmful cosmic radiations will scattered away from the Earth, which cause the occurrence of Aurora phenomenon.
2. Magnesium strip burns with a bright light and changes into powder (magnesium oxide).

7 6th October Directorate

1 (A) 1. halogens – one.
2. lanthanides – actinides.
3. 300 – 3
4. Archaeopteryx
5. cesium – fluorine.
6. thermosphere.

(B) 1. Because it contains 99% of the total atmospheric water vapour.
2. Because they react with water forming alkaline solutions.
3. Because they have the same number of electron(s) in their outermost energy level.

(C) 1. The electronic configuration of ($_{11}$Na) is (2 , 8 , 1) , so it locates in period (3) and group (1A).
2. The electronic configuration of ($_{10}$Ne) is (2 , 8) , so it locates in period (2) and group (0).

2 (A) 1. (✗) 2. (✓) 3. (✗)
4. (✗) 5. (✗) 6. (✓)

(B) 1. It is used in food preservation.
2. It is used in aeroplanes to measure the elevation of navigation based on the atmospheric pressure.
3. They play an important role in scattering of harmful charged cosmic radiations away from the Earth.

(C) The volume of the gas that evolves at the cathode = $30 \times 2 = 60\ cm^3$.
The gas that evolves at the anode is oxygen, the gas that evolves at the cathode is hydrogen.

3 (A) 1. Metalloids. 2. Electronegativity.
3. Hydrogen bonds.
4. Global warming phenomenon.
5. Extinction. 6. Bohr.

(B) 1. H_2CO_3 2. $2H_2\uparrow + O_2\uparrow$
3. no reaction.

(C) 1. Na 2. m-block

4 (A) 1. c 2. b 3. a
4. a 5. b 6. c

(B) 1. Quagga 2. CO_2 3. Cast of ferns

(C) Biological pollution : infection with bilharzia, typhoid and hepatitis.
Chemical pollution : lead causes the death of brain cells, mercury causes blindness and arsenic causes liver cancer.

8 Kerdasa Directorate

1 (A) 1. b 2. b 3. b 4. d

(B) 1. $^{27}_{13}Al < ^{24}_{12}Mg < ^{23}_{11}Na < ^{39}_{19}K$

2. $_{53}I < _{35}Br < _{17}Cl < _{9}F$

3. Trilobite < Fish < Archaeopteryx < Mammoth

4. Far UV < Medium UV < Near UV

(C) The collected volume of the gas at the negative pole = $5 \times 2 = 10\ cm^3$.

2 (A) 1. Dodo bird – ibis bird
2. Cobalt 60 – gamma
3. hydrogen bonds – single covalent bonds.
4. (3) – (5A)

(B) 1. $2Na + Cl_2 \longrightarrow 2NaCl$

2. $2Mg + O_2 \xrightarrow{\Delta} 2MgO$

$MgO + H_2O \longrightarrow Mg(OH)_2$

(C) 1. $_4Be$ is a metal, $_1H$ and $_8O$ are nonmetals and $_5B$ is a metalloid.

2. Dinosaur's eggs fossil is a petrified fossil, ferns fossil is a cast fossil, ammonites fossil is a mold fossil and amber fossil is a complete body fossil.

3 (A) 1. 37 Km 2. 13 Km
3. – 60°C 4. 0°C
5. 100 mbar 6. 1 mbar
7. horizontal 8. vertical

(B) 1. Because they have the same number of electron(s) in their outermost energy level.
2. Because it dissolves in water forming acidic solution, which turns violet litmus solution into red.
3. Because nitrogen oxides which is one of ozone layer pollutants, are produced from the burning of fuel of concorde aeroplanes.
4. Due to the decrease in its boiling point (–196°C).

(C) 1. It is used in aeroplanes to measure the elevation of navigation based on the atmospheric pressure.
2. It is very important in wireless communications and broadcasting.

4 (A) 1. Electronegativity.
2. Natural protectorates.
3. Quagga. 4. Food chain.

(B) 1. no reaction. 2. $MgCl_2 + H_2\uparrow$
3. $2H_2O - 2NaOH$ 4. CO_2

(C) - The amount of decrease in temp.
= height (Km) × 6.5
= 3.5 × 6.5 = 22.75°C
- The temp. at a point of height 3.5 Km
= The temp. at the sea level
– the amount of decrease in temp.
= 23 – 22.75 = 0.25°C

Alexandria Governorate

9 Taymour English School

1 (A) 1. Natural protectorate.
2. Aurora phenomenon.
3. f-block.

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4. Chemical activity series.
5. Isobar.
6. Infrared radiation.

(B) 1. Neon ($_{10}Ne$). 2. Ibis bird.
3. Chlorofluorocarbon compounds (CFC_s).
4. Silicon.
5. Aluminium oxide (Al_2O_3).

(C) - The amount of decrease in temp.
= height (Km) × 6.5
= 7.252 × 6.5 = 47.138°C
- The temp. at a height 7252 meters
= The temp. at the sea level
- the amount of decrease in temp.
= 22 – 47.138 = – 25.138°C

2 (A) 1. Because alkalis are bases dissolve in water, but not all bases dissolve in water.
2. Because the lower part of this layer does not contain clouds or weather disturbances and the air movement is horizontal.
3. Because it has a few members and it is strongly affected by the absence of one of its species.
4. Because its head is covered with white feathers which make it looks like bald.

(B) The electronic configuration of this element is (2 , 8 , 5), so its atomic number = 2 + 8 + 5 = 15 and its block in the modern periodic table is p-block.

(C) 1. Archaeopteryx 2. Hydrogen – weak
3. a highly rarefied – helium and hydrogen.
4. Rutherford

3 (A) 1. It is used to determine the possible day weather based on the atmospheric pressure.
2. It is used is the preservation of cornea of the eye.
3. They play an important role in scattering of harmful charged cosmic radiation away from the Earth.

(B) 1. Occurrence of biological pollution, which includes infection with many diseases such as : bilharzia, typhoid and hepatitis.
2. Occurrence of chemical pollution, which leads to blindness.
3. Plastic reacts with chlorine gas (which is used as water disinfectant) leading to the increase in the infection rate of cancer.

(C) $Mg + 2HCl \xrightarrow{dil.} MgCl_2 + H_2\uparrow$
$S + HCl \xrightarrow{dil.}$ no reaction

(D) 1. b 2. c 3. c 4. d
5. b 6. c 7. d

4 (A) 1. Amber 2. $2KCl + Br_2$
3. cathode 4. minerals
5. Mammoth – snow
6. Radiolaria – petroleum

(B) 1. It reacts instantly with water and hydrogen gas evolves which burns with a pop sound.
2. It is an example of complicated ecosystems, which is not affected much by the absence of one of its species.

(C) 1. $O_2 \xrightarrow{UV} O + O$
$O + O_2 \xrightarrow{UV} O_3$
ozone gas
2. He discovered the main energy level of the atom, and their number reaches 7 in the heaviest know atoms till now.
3. Helium is an inert gas.
Fluorine is the strongest nonmetal.

10 El-Agamy Directorate

1 (A) 1. d 2. a 3. c 4. b
5. b 6. a

(B) 1. Because it is a semi-conductor which its ability to conduct electricity depends on temperature.
2. Due to the presence of nummulites fossils in its limestone rocks.
3. Because the lower part of stratosphere layer does not contain clouds or weather disturbances and the air movement is horizontal.
4. Because the difference in electronegativity between Hydrogen and oxygen is relatively high.

2 (A) 1. Ozone hole. 2. Extinction.
3. Electronegativity.
4. Natural protectorate.
5. Chemical activity series. 6. Lead.

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(B) 1. Acidic oxides : They are nonmetal oxides.
Basic oxides : They are metal oxides.
2. Thermosphere : It is the hottest layer.
Mesosphere : It is the coldest layer.
3. Simple ecosystem : It is an ecosystem that has a few members and it is strongly affected by the absence of one of its species.
Complicated ecosystem : It is an ecosystem that has multiple members and it is not affected much by the absence of one of its species.

(C) 1. They are elements. which have the properties of both metals and nonmetals.
2. They are traces and remains of old living organisms that are preserved in sedimentary rocks.

3 **(A)** 1. four – ten 2. chemical – thermal
3. reptiles – birds. 4. (16) – (18).
5. mesosphere – thermosphere

(B) 1. The electronic configuration of ($_{10}$Ne) is (2 , 8), so it locates in period (2) and group (0).
2. The electronic configuration of ($_{6}$C) is (2 , 4), so it locates in period (2) and group (4A).
3. The electronic configuration of ($_{14}$Si) is (2 , 8 , 4), so it locates in period (3) and group (4A).
4. The electronic configuration of ($_{3}$Li) is (2 , 1) , so it locates in period (2) and group (1A).
5. The electronic configuration of ($_{20}$Ca) is (2 , 8 , 8 , 2), so it locates in period (4) and group (2A).

(C) 1. $C + O_2 \xrightarrow{\Delta} CO_2$
2. $Mg + 2HCl \xrightarrow{dil.} MgCl_2 + H_2\uparrow$
3. $2Na + 2H_2O \longrightarrow 2NaOH + H_2\uparrow$
4. $Cl_2 + 2KBr \longrightarrow 2KCl + Br_2$

4 **(A)** 1. (✗) ..... grey bear from extinction.
2. (✓)
3. (✗) ..... 700 Km from the sea level.
4. (✗) ..... is bromine.
5. (✓)
6. (✓)

(B) 1. Amber fossil is formed.
2. Occurrence of aurora phenomenon.
3. The ecosystem is strongly affected.

(C) - The amount of decrease in temp.
= height (km) × 6.5
= 4 × 6.5 = 26°C
- The temp. at the top of the mountain
= The temp. at the sea level
– the amount of decrease in temp.
= 26 – 26 = 0°C

11 El-Montazah Directorate

1 **(A)** 1. $MgO - CO_2$
2. troposphere – mesosphere
3. bromine – iodine
4. lithium – cesium

(B) 1. Iodine. 2. Papyrus plant.
3. Far ultraviolet.

(C) - The amount of decrease in temp.
= height (km) × 6.5
= 2 × 6.5 = 13°C
- The temp. at the top of the mountain
= the temp. at its foot – amount of decrease in temp.
= 13 – 13 = 0°C

2 **(A)** 1. a 2. b 3. a
4. c 5. b 6. d

(B) 1. $Br_2 + 2\,KI \longrightarrow 2\,KBr + I_2$
2. $Mg + 2HCl \longrightarrow MgCl_2 + H_2\uparrow$

(C) 1. It is used in the preservation of cornea of the eye.
2. It is used as an insecticide to preserve agricultural crops.

3 **(A)** 1. an inert gas. 2. Freon.
3. Snow. 4. (– 60°C)
5. picometre. 6. (4)

(B) 1. The electronic configuration of ($_{9}$F) is (2 , 7) , so it locates in period (2) and group (7A).
2. The electronic configuration of ($_{13}$Al) is (2 , 8 , 3), so it locates in period (3) and group (3A).

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(C) 1. Simple ecosystem : It is strongly affected by the absence of one of its species.
Complicated ecosystem : It is not affected much by the absence of one of its species.

2. Altimeter : It is used in aeroplanes to measure the elevation of navigation based on the atmospheric pressure.
Aneroid : It is used to determine the possible day weather based on the atmospheric pressure.

4 (A) 1. Electronegativity. 2. Extinction.
3. Thermosphere. 4. Hydrogen bonds.
5. Atmospheric pressure.

(B) 1. Due to the presence of hydrogen bonds between its molecules.
2. Because its lower part does not contain clouds or weather disturbances and the air movement is horizontal.
3. Because they have different atomic weights.

(C)

The odd word	The scientific term of the others
1. Quagga	Endangered species.
2. $_3$Li	Elements of period (3).
3. Nitrogen	Inert gases.

12 East Alexandria Directorate

1 (A) 1. (67) 2. Bohr
3. sedimentary 4. (1013.25)

(B) 1. P–block. 2. Water.
3. Atomic number. 4. Bromine.

(C) 1. Alkali metals. 2. monovalent.

2 (A) 1. b 2. a 3. a 4. a

(B) 1. (x) 2. (✓) 3. (✓) 4. (✓)

(C)

P.O.C	Mesosphere	Thermosphere
Importance :	It protects the planet Earth from celestial rocky masses that enter the atmospheric envelope.	Its upper part contains charged ions, which is very important in wireless communication and broad casting.
Temperature at its top :	– 90°C	1200°C

3 (A) 1. b 2. d 3. a 4. c

(B) 1. (20 Km). 2. $_{13}$Al
3. Stratopause 4. Pure water

(C) Due to the decrease in its boiling point (–196°C).

4 (A) 1. Panda bear 2. Mosses.
3. Hydrogen. 4. Bromine.

(B) 1. Dinosaur's foot print.
2. Tropical hurricanes.
3. Volcanic eruptions. 4. Na_2O

(C) $Mg + 2HCl \xrightarrow{dil} MgCl_2 + H_2\uparrow$

13 Qalyoubia Governorate

1 (A) 1. group 2. transition
3. water 4. (7A)

(B) 1. Papyrus plant. 2. Methyl bromide gas.
3. Dodo bird. 4. Silver.

(C) 1. The electronic configuration of ($_{11}$Na) is (2 , 8 , 1) , so it locates in period (3) and group (1A).
2. The electronic configuration of ($_{20}$Ca) is (2 , 8 , 8 , 2), so it locates in period (4) and group (2A).

2 (A) 1. Natural protectorates.
2. Chemical activity series.
3. Tropopause. 4. F-block.

(B) 1. Picometre. 2. Dobson. 3. mbar.

(C) - The amount of decrease in temp.
= height (Km) × 6.5
= 6 × 6.5 = 39°C
- The temp. at a height of 6 km
= The temp. at the sea level
– The amount of decrease in temp.
= 30 – 39 = – 9°C

3 (A) 1. b 2. c 3. d 4. b

(B) 1. $2 KCl + Br_2$ 2. $Mg(OH)_2$
3. H_2O

(C) Simple ecosystem : It is strongly affected by the absence of one of its species.
Complicated ecosystem : It is not affected much by the absence of one of its species.

4 (A) 1. decreases. 2. (118)
3. Halons 4. insect

(B) 1. (×) ..... a thermal effect.
2. (×) Aneroid ..... 3. (✓)
4. (×) ..... in mesosphere layer.

(C) 1. Because the lower part of this layer does not contain clouds or weather disturbances, and the air movement is horizontal.
2. Because he predicted the discovery of new elements.

14 Menofia Governorate

1 (A) 1. Kerosene – moist air.
2. hydrogen – helium 3. $CO_2 + H_2O$
4. petroleum – sedimentary rocks

(B) 1. $_8O$ 2. $_{19}K$
3. one – two 4. $_3Li$

(C) $Cl_2 + 2\ KBr \longrightarrow 2KCl + Br_2$

2 (A) 1. a 2. c 3. c 4. b

(B) 1. O^{-2} 2. Dodo bird
3. Oxygen gas 4. Petrified forest

(C) - The amount of change in temp.
= The temp. at its foot – Temp. at its top
= 30 – (–9) = 39°C
- The height of the mountain
$= \frac{\text{The amount of change in temp.}}{6.5}$
$= \frac{39}{6.5} = 6$ Km.

3 (A) 1. Atmospheric pressure. 2. Petrification.
3. Metalloids. 4. Lead.

(B) 1. iodine. 2. decreases
3. lose electron(s). 4. CO_2

(C) Simple ecosystems : It is strongly affected by the absence of one of its species.
Complicated ecosystem : It is not affected much by the absence of one of its species.

4 (A) 1. metals 2. Nitrogen oxides
3. insect 4. exterior

(B) 1. Because it can form hydrogen bonds with water.
2. Because that the Van–Allen Belts play an important role in scattering of harmful charged cosmic radiations away from the Earth.
3. Because it leads to melting snow of the both south and north poles and severe climatic changes.
4. Due to the presence of nummulites fossils in its limestone rocks.

(C) (X) + (Y) = 24
∵ (Y) gas is a double amount of (X) gas.
∴ (X) + (2X) = 24
(3X) = 24
(X) gas $= \frac{24}{3} = 8\ cm^3$
(Y) gas = 2 × 8 = 16 cm^3

15 Dakahlia Governorate

1 (A) 1. atomic numbers – energy sublevels
2. alkaline – hydrogen
3. troposphere – exosphere.
4. Snow – amber

(B) 1. (Y) 2. (M) 3. (Z) 4. (X)

(C) 1. $2H_2O \xrightarrow{\text{Electrolysis}} 2H_2\uparrow + O_2\uparrow$
2. The volume of the gas at the positive pole
$= \frac{5}{2} = 2.5\ cm^3$

2 (A) 1. f–block.
2. Far ultraviolet radiation.
3. Hydrogen bonds
4. Coral fossils.

(B) 1. Zinc and iron 2. sugar
3. complete whales' skeleton fossils.
4. a snail.

(C) $O_2 \xrightarrow{UV} O + O$
$O + O_2 \longrightarrow O_3$
ozone gas

3 (A) 1. $F_9 < {}_8O < {}_6C < {}_{11}Na < {}_{19}K$
2. Rutherford.
3. There are two dangerous phenomena that facing the Earth, which are erosion of ozone layer in stratosphere and global warming in troposphere.
4. Dodo bird.

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(B) 1. (×) 2. (×) 3. (✓) 4. (×)

(C) 1. $Mg + 2HCl \xrightarrow{dil.} MgCl_2 + H_2\uparrow$

2. $2Na + Cl_2 \longrightarrow 2NaCl$

4 (A)

The odd word	The scientific term of the rest
1. Meteorite impact the Earth	Reasons of extinction in recent ages.
2. Quagga	The endangered species.
3. It is surrounded by Van-Allen Belts.	Stratosphere layer.
4. $_{16}S$	Inert gases.

(B) 1. b 2. c 3. b 4. a

(C) ∵ (M_2O_3) is formed when (M) is reacting with oxygen.

∴ (M) valency electrons of its outer energy level are 3,

∵ (M) locates in period (3).

∴ (M) has three energy levels,

So (M) atomic number = 2 + 8 + 3 = 13, and it locates in p-block in the modern periodic table.

16 Gharbia Governorate

1 (A) 1. gaseous – solid 2. hydrogen – 14

3. (35) 4. Ras Mohamed

(B) 1. Methyl bromide gas 2. (13°C)

3. (12) 4. metal

(C) 1. $Mg + 2HCl \xrightarrow{dil.} MgCl_2 + H_2\uparrow$

2. $2H_2O \xrightarrow{Electrolysis} 2H_2\uparrow + O_2\uparrow$

2 (A) 1. Isobar. 2. Remains.

3. Metalloids

4. Mendeleev's periodic table.

(B)

The odd word	The scientific term of the others
1. CO_2	Basic oxides
2. Helium	Alkali metals
3. Fossil record	Types of fossils
4. Dodo bird	Endangered species

(C) 1. Disappearance of some coastal areas.

2. Extinction of some polar animals like the polar bear and seals.

3 (A) 1. (×) ..... and birds.

2. (✓) 3. (✓)

4. (×) ..... in the same period .....

(B) [1] 1. The electronic configuration of ($_{10}Ne$) is (2 , 8) , so it locates in period (2) and group (0).

2. The electronic configuration of ($_{19}K$) is (2 , 8 , 8 , 1), so it locates in period (4) and group (1A).

[2] - The amount of change in temp.

= The temp. at its foot – Temp. at its top

= 30 – (– 6) = 36°C

- The height of the mountain

$$= \frac{\text{The amount of change in temp.}}{6.5}$$

$$= \frac{36}{6.5} = 5.538 \text{ Km.}$$

(C)

	Old extinction	Recent extinction
Causes	1. Meteorite impacts with Earth.	1. Destroying natural habitat.
	2. The violent Earth movement.	2. Overhunting.
	3. Exposure of the Earth to long ice age.	3. Environmental pollution.
	4. Toxic gases which evolved from volcanoes.	4. Climatic changes resulted from industrial activities of man and natural disasters.

4 (A) 1. b 2. a 3. a 4. c

(B) 1. Bromine. 2. Papyrus plant.

3. Infrared radiation. 4. Silver.

(C) 1. Because it is characterized by containing a large number of members of living organisms, and it is not affected much by the absence of one of its species.

2. Because not all fossils was lived for a short period of time in the past and had a wide geographical range distribution.

CamScanner

17 Damietta Governorate

1 **(A)** 1. atomic numbers. 2. (7A)
3. exosphere 4. sedimentary

(B) 1. an inert gas. 2. hydrogen
3. basic 4. strong metal.

(C) - The volume of the gas evolved at anode
$= 2 \times 5 = 10\ cm^3$
- The volume of the gas evolved at cathode
$= 2 \times 10 = 20\ cm^3$
- When approaching a glowing splint to the gas evolved above the cathode, it burns with a pop sound.

2 **(A)** 1. Electronegativity. 2. Radiant pollution.
3. Food chain.
4. Far ultraviolet radiation.

(B) 1. Water. 2. Bromine.
3. Papyrus plant. 4. Dodo bird.

(C) - The amount of decrease in temp.
= height (Km) $\times$ 6.5 = 2 $\times$ 6.5 = 13°C
- The temp. at a point of height 2 Km
= The temp. at the sea level
– The amount of decrease in temp.
= 24 – 13 = 11°C

3 **(A)** 1. c 2. b 3. d 4. b

(B) 1. (✓) 2. (✓) 3. (✗) 4. (✗)

(C) Because sugar molecules can form hydrogen bonds with water molecules.

4 **(A)** 1. c 2. e 3. a 4. b

(B) 1. mesosphere layer 2. Cu and Ag
3. petrified fossils.
4. period (3) and group (2A)

(C) Sodium reacts strongly with water and hydrogen gas evolves which burns with a pop sound.

18 Kafr El-Sheikh Governorate

1 **(A)** 1. b 2. b 3. a

(B) 1. Foraminifera. 2. Mammoth.
3. Silicon.

(C) 1. - Disappearance of some coastal areas.
- Extinction of some polar animals like the polar bear and seals.
2. Death of brain cells.

2 **(A)** 1. (✓) 2. (✗) 3. (✓)

(B) 1. Natural protectorates. 2. Tropopause.
3. Mendeleev's periodic table.

(C) 1. Because sugar molecules can form hydrogen bonds with water molecules.
2. ***Answer by yourself.***

3 **(A)** 1. Bromine – iodine 2. lithium – cesium
3. troposphere – mesosphere

(B) 1. Bald eagle. 2. Nitrogen
3. Oxygen.

(C) - The amount of change in temp.
= The temp. at the foot of the mountain
– The temp. at the top of the mountain
= 30 – (–9) = 39°C
- The height of the mountain
$= \frac{\text{The amount of change in temp.}}{6.5}$
$= \frac{39}{6.5} = 6$ Km

4 **(A)** 1. $MgCl_2 + H_2\uparrow$ 2. $CO_2 + H_2O$
3. $2\ NaOH + H_2\uparrow$

(B) 1. Period (3). 2. Group (1A).
3. s-block

(C) 1, 2. ***Answer by yourself.***

19 Behira Governorate

1 **(A)** 1. Zinc – copper
2. hydrogen – electronegativity
3. Stratosphere – ozonic atmospheric envelope.
4. Remains of a shark's teeth – remains of a dinosaur's skull

(B) 1. Biological pollution 2. p-block
3. H_2 4. period number

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(C) – Magnesium oxide reacts with water forming magnesium hydroxide (alkaline solution), which turns violet litmus solution into blue.

$$MgO + H_2O \longrightarrow Mg(OH)_2$$

– Carbon dioxide reacts with water forming carbonic acid (acidic solution), which turns violet litmus solution into red.

$$CO_2 + H_2O \longrightarrow H_2CO_3$$

2 (A) 1. Inert gases. 2. Picometre.
3. Ultraviolet radiation.
4. Natural protectorates.

(B) 1. Sodium. 2. Papyrus plant.
3. Cast of ferns. 4. Iodine.

(C) *Answer by yourself.*

3 (A) 1. a 2. c 3. d 4. b

(B) 1. c 2. b 3. e 4. a

(C) 1. Because they have the same number of electrons in their outermost energy levels.

2. To prevent their reaction with moist air.

4 (A)

The odd word	The scientific term of the others
1. Silver	active metals
2. Methyl bromide	greenhouse gases
3. Fossil of ferns	mold fossils
4. Bald eagle	Extinct species

(B) 1. (1013.25) mbar. 2. (6) 3. (–196°C)
4. (40) million years ago.

(C) - The volume of the gas produced at anode $= \frac{8}{2} = 4\ cm^3$

- Its name is oxygen.

20 Ismailia Governorate

1 (A) 1. mesosphere – thermosphere.
2. Bilharzia – typhoid.
3. Mammoth – quagga.
4. gaseous – solid

(B) 1. (3) 2. (10) 3. (3) 4. (2A)

(C) 1, 2. *Answer by yourself.*

2 (A) 1. b 2. c 3. b 4. a
5. d 6. c 7. a 8. d

(B) 1. Index fossils. 2. Group (7A)
3. Petrification. 4. Cobalt 60

(C) - The amount of decrease in temp.
= height (km) × 6.5 = 2 × 6.5 = 13°C

- The temp. at it top = ? temp. at its foot – the amount of decrease in temp.
= 40 – 13 = 27°C

3 (A) 1. (✗) 2. (✓) 3. (✓) 4. (✗)
5. (✓) 6. (✗) 7. (✗) 8. (✓)

(B)

The odd word	The scientific term of the others
1. Iodine	Metalloids
2. Halons	Greenhouse gases

(C) 1, 2. *Answer by yourself.*

4 (A) 1. Radiolaria. 2. Stratosphere.
3. Desert. 4. Silicon

(B) 1. b 2. c 3. e 4. a

(C) 1. $Mg + 2HCl \xrightarrow{dil.} MgCl_2 + H_2\uparrow$

2. electrolysis of water – (20)

21 Port Said Governorate

1 (A) 1. Electronegativity.
2. Chemical Activity series.
3. Aurora phenomenon.
4. Fossils

(B) 1. d 2. a 3. b 4. e

(C) *Answer by yourself.*

2 (A) 1. lead – arsenic 2. fourth – (10)
3. troposphere – exosphere
4. petroleum – sedimentary rocks.

(B) 1. (✓) 2. (✗) 3. (✗) 4. (✓)

(C) 1, 2. *Answer by yourself.*

3 (A) 1. d 2. c 3. c 4. b

(B) 1. Rutherford. 2. Bohr.
3. Dobson. 4. Moseley.

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(C) – Acidic oxides dissolve in water, forming acidic solution which turns violet litmus solution into red.

– Basic oxides dissolve in water, forming alkaline solution which turns violet litmus solution into blue.

4 (A)

The odd word	How others are related
1. Sodium	Metalloids
2. Methyl bromide	Greenhouse gases
3. Dodo bird	Endangered species
4. Angiosperms	Types of fossils

(B) 1. p-block 2. Thermosphere
3. mbar. 4. amber.

(C) – The name of the gas is hydrogen.
– The apparatus is Hofmann's voltameter.

22 Minia Governorate

1 (A) 1. Mg + 2HCl 2. (18) – (15)
3. nummulites – limestone
4. 1000 Km – 1013.25

(B) 1. (8) 2. Inert gases group.
3. a. (E) b. (N)

(C) 1. It reacts at high temperature with hot water vapour only.
2. It doesn't react with water.

2 (A) 1. b 2. c 3. b 4. c

(B) 1. Iodine. 2. Papyrus plant.
3. Water. 4. Foraminifera.

(C) 1. Melting the snow of the two poles of Earth.
2. Severe climatic changes.

3 (A) 1. Van-Allen Belts. 2. Electronegativity.
3. Sodium. 4. Transition elements.

(B) 1. alkalis. 2. ionosphere.
3. lead 4. Isobar

(C) *Answer by yourself.*

4 (A) 1. Picometre. 2. Halons.
3. Desert. 4. Archaeopteryx.

(B) 1. Scientist Bohr. 2. Scientist Dobson.
3. Scientist Rutherford.
4. Coral reefs and coloured fish.

(C) The elements are arranged in an ascending order according to :
- Their atomic number.
- The way of filling their energy sublevels with electrons.

23 Sohag Governorate

1 (A) 1. s – d 2. basic – acidic
3. monovalent – negative
4. internal – external
5. Dinosaur – mammoth

(B) 1. Because of the rarity of alternative that compensates this absence.
2. Due to the presence of hydrogen bonds between its molecules.

(C) - The amount of increase in temp.
= height (km) × 6.5
= 3 × 6.5 = 19.5°C
- The temp. at the sea level
= the temp. at the height of 3 Km
+ the amount of increase in temp.
= 10 + 19.5 = 29.5°C

2 (A) 1. b 2. d 3. b 4. b
5. b 6. b

(B) 1. It is used in food preservation.
2. They are used in extinguishing fires.
3. They play an important role in scattering of harmful charged cosmic radiations away from the Earth.
4. It is used in electrolysis of water.

(C) 1. Ferns fossil is a cast fossil.
Dinosaur's egg is a petrified fossil.
2. Infrared rays have thermal effect.
Ultraviolet rays have chemical effect.

3 (A) 1. Radiant pollution.
2. Atmospheric pressure.
3. Amber. 4. Metalloids.
5. Extinction. 6. Mesosphere.

(B) 1. Global warming phenomenon.
2. He left empty gaps (cells) in his table.

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(C) 1. $2Mg + O_2 \xrightarrow{\Delta} 2\ MgO$

2. $2Na + 2H_2O \longrightarrow 2\ NaOH + H_2\uparrow$

4 (A) 1. (✗) 2. (✗) 3. (✗) 4. (✓) 5. (✓) 6. (✓)

(B) 1. It is a phenomenon that appears as brightly coloured light curtains seen at both north and south poles of the Earth.

2. It is the arrangement of metals in a descending order according to the degree of their chemical activity.

(C) 1, 2. ***Answer by yourself.***

24 Luxor Governorate

1 (A) 1. reptiles – birds 2. (7) – (18)

3. water – alkaline solution.

4. thermal – ultraviolet

(B) 1. It will be turned into a positive ion.

2. It will be a complete body fossil.

3. Biological pollution occurs.

4. Far ultraviolet rays will penetrates to the Earth.

(C) 1, 2. ***Answer by yourself.***

2 (A) 1. Extinction. 2. Ionosphere.

3. Transition elements.

4. Aurora phenomenon.

(B) 1. Dodo bird. 2. Cesium.

3. Silver. 4. Oxygen.

(C) ***Answer by yourself.***

3 (A) 1. b 2. b 3. b 4. b

(B) 1. ***Answer by yourself.***

2. Because their outermost energy levels contain seven electrons, so they tend to gain one electron during the chemical reactions.

3. Because the organic matter of wood, is replaced part by part with minerals.

4. Because it comes before sodium in the chemical activity series.

(C) ***Answer by yourself.***

4 (A) 1. mesosphere. 2. neutral

3. silicon 4. a basic oxide

(B) 1. (✗) 2. (✓) 3. (✓) 4. (✗)

(C) 1. $2Mg + O_2 \xrightarrow{\Delta} 2\ MgO$

2. $2Na + 2H_2O \longrightarrow 2\ NaOH + H_2\uparrow$

25 Aswan Governorate

1 (A) 1. b 2. d 3. c 4. a

(B) 1. They are elements, which have the properties of both metals and nonmetals.

2. They are traces and remains of old living organisms that are preserved in sedimentary rocks.

(C) 1, 2. ***Answer by yourself.***

2 (A) 1. Stratopause. 2. Petrification.

3. Global warming phenomenon.

4. Far ultraviolet radiation.

(B) 1, 2. ***Answer by yourself.***

(C) 1. $CO_2 + H_2O \longrightarrow H_2CO_3$

2. $Mg + 2HCl \xrightarrow{dil.} MgCl_2 + H_2\uparrow$

3 (A) 1, 2 , 3 and 4. ***Answer by yourself.***

(B) 1. To prevent their reactions with moist air.

2. ***Answer by yourself***

(C) 1. Bald eagle. 2. Quagga.

4 (A) 1. (7) – (18) 2. chemical – thermal

3. petroleum – sedimentary rocks.

4. their atomic weights – their atomic numbers.

(B) 1. (5) 2. (12)

(C) ***Answer by yourself.***

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PART 3

Final Examinations 2021



هذا العمل خاص بموقع ذاكرولى التعليمى ولا يسمح بتداوله على مواقع أخرى

PART 3

1 Cairo Governorate — Al Bayan Language School

Answer the following questions :

Question 1

A Complete the following statements :

1. The alkali metals are ..... valent.
2. The suitable medium to form a mammoth fossil is .....
3. ..... and ..... are considered from ozone layer pollutants.
4. As we go up 1 km above sea level the temperature ..... with ..... °C.
5. Sodium is kept under the surface of ....., to prevent it from the reaction with .....
6. The elements of group 7 A are called .....
7. The glass permits the passage of ..... rays and visible light.

B Correct the underlined word :

1. The strongest non-metal element occurs in the **1st group [1A]**.
2. The ferns fossil indicates that the environment it lived in was **a seafloor**.
3. Each **group** in the modern periodic table ends with inert gas.

Question 2

A Choose the correct answer :

1. The density of pure water in solid state is .....
   a. less than its density in liquid state. b. equal to its density in liquid state.
   c. greater than its density in liquid state. d. greater than its density in vapour state.
2. The hottest atmospheric layer is .....
   a. troposphere. b. stratosphere. c. mesosphere. d. thermosphere.
3. The ozone hole appears over the .....
   a. north pole. b. equator. c. middle east. d. south pole.
4. The air moves ..... in the stratosphere layer.
   a. horizontally b. vertically c. (a) & (b) d. no correct answer
5. The fossils exist in the sedimentary rocks in the Mokattam mountain are .....
   a. ferns. b. coral. c. nummiulite. d. all the pervious.
6. The volume of hydrogen gas evolving from water electrolysis equals ..... the oxygen volume.
   a. that of b. double c. half d. four times

B Give reasons for :

1. The occurrence of aurora phenomenon.
2. Sulphur dioxide is considered as acidic oxides.

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كتاب المعاصر موقع ذاكرولى التعليمى الصف الثانى الاعدادى

3. Water molecule is from polar molecules.
4. Rains, clouds, and winds are in the troposphere.

C Mention one example for :

1. Endangered plant.
2. Fossil of complete body.
3. Petrified fossil.
4. From the green house gases.

Question 3

A Write the scientific term :

1. The atmospheric envelope layer that contains a certain limited amount of helium and hydrogen gases only.
2. The environmental system that is not affected severely by the absence of one species of the living organisms that live in it.
3. A bond that exists between water molecules.
4. The continuous decrease in the numbers of individuals from the same species of living organisms without compensation with birthing.
5. The process of conversion of the organic matter of an old living organism into solidified materials, due to replacing the organic matter by minerals.
6. Two magnetic belts help in dispersing the harmful cosmic radiation a way from the Earth.

B Mention one importance for :

1. Exosphere region.
2. Altimeter.
3. Silicon.
4. Foraminafera microfossil.

C Compare between the following :

1. Atmospheric pressure and atmospheric air. (Defination only)
2. Mesosphere and ionosphere. (Temperature only)

Question 4

A Put (✓) or (✗) and correct the wrong ones :

1. Methyl bromide is used in extinguishing fires. ( )
2. The ozone layer allows the passage of all ultraviolet rays near and medium. ( )
3. The atomic size decreases in periods as the atomic number increases. ( )
4. Lacking of plants on Earth leads to the increase in temperature. ( )
5. The methane gas and nitrous oxide are considered from the green house gases. ( )
6. The Quagga is the most famous extinct kind in the old times. ( )
7. Nonmetal oxides are considered as basic oxides. ( )
8. The index fossil indicated the age of the sedimentary rocks. ( )

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الصف الثانى الاعدادى موقع ذاكرولى التعليمى كتاب المعاصر

PART 3

B What happens in the following situations ... ?

1. Adding the purple sun flower solution to a jar has a piece of burning coal.
2. The passage of electric current through a Hofmann's voltameter containing acidic water.
3. Extinction of a species from a balance ecosystem.
4. Put a lightening magnesium strip inside a test tube contains oxygen.

C Write the symbolic chemical equations representing the following reactions :

1. The reaction between chlorine gas and potassium bromide.
2. Dissolving of magnesium oxide in water.

2 Cairo Governorate — Al-Waha Language School

Answer the following questions :

Question 1

Complete the following statements :

1. Moseley located ..... and ..... elements below its table.
2. The atomic size of lithium ($_3$Li) atom is ..... than that of the nitrogen ($_7$N) atom and ..... than that of sodium ($_{11}$Na) atom.
3. The bond between hydrogen atom and oxygen atom in water molecule is ..... bond, while bonds among water molecules are ..... bond.
4. When the temperature of water decreases than 4°C its ..... decreases, while its volume .....
5. Ozone gas is formed in two steps which are :

   a. $O_2 \xrightarrow{UV} O +$ ..... b. $O +$ ..... $\longrightarrow O_3$

6. ..... is the unit used to measure the degree of ozone.
7. Meteors burn in ..... layer of atmosphere.
8. ..... protectorate is the first established natural protectorate in Egypt.
9. During the chemical reaction, metal atom tends to ..... electrons.

Question 2

A Calculate the atomic number of the following elements :

1. An element is located in the 3rd period and group (2 A).
2. An element is located in the 3rd period and group (7 A).

هذا العمل خاص بموقع ذاكرولى التعليمى ولا يسمح بتداوله على مواقع أخرى

B Write the scientific term for each of the following :

1. The continuous increase of the average temperature of the air near the surface of the Earth.
2. The measuring unit of the atmospheric pressure.
3. Fossils are formed as a result of the rapid burying of organisms in a medium that preserved them from decomposing.
4. The inert gas, which has the same electronic structure of sodium ion (Na^+).
5. The bond which is responsible for the abnormal properties of water.
6. The weight of air column of an atmosphere height above a unit area.
7. The atmospheric layer, in which the ozone layer is located.
8. A part from million of million part of metre.
9. One of the atmosphere components that its ratio increase in recent years to reach about 0.038 %.
10. Traces and remains of old living organisms that are preserved in the sedimentary rocks.

C Calculate the volume of the gas that evolves at the anode if the volume of the gas that evolves at the cathode is 24 cm^3.

Question 3

A Give reasons for :

1. El-Mokattam's mountain was a sea floor more than 35 million years ago.
2. The desert ecosystem is significantly affected by the absence of one of its species.
3. The lower part of stratosphere is suitable for flying aeroplanes.
4. Liquefied nitrogen is used in the preservation of cornea of the eye.

B Choose from column (B) what suits in column (A) :

(A)	(B)
1. Mesopause	a. protects man's life from ultraviolet rays.
2. Tropopause	b. protect man's life from cosmic radiations.
3. Ozone layer	c. is the region between mesosphere and thermosphere.
4. Van-Allen belts	d. is the region between mesosphere and stratosphere.
5. Ionosphere	e. is the region between stratosphere and troposphere.
6. Stratopause	f. is a layer used in wireless communication.
	g. its thickness is 13 kilometers.

Question 4

A How can you differentiate chemically between Copper and magnesium [Using HCl] ?

[Write the chemical equation if it is possible]

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PART 3

B Find the temperature at a point of a height 3 km above sea level if the temperature at sea level is 22°C.

C Locate the position of the following elements in the modern periodic table :

[Electronic configuration, group number and period number].

1. Hydrogen ($_{1}H$).
2. Neon ($_{10}Ne$).
3. Calcium ($_{20}Ca$).

D Correct the underlined words :

1. As we move down in group (7A) the **metallic property** decreases.
2. **Electronegativity** decreases as we move from left to right in periodic table.
3. The first discovered fossil of mammoth were found preserved in **amber**.
4. Distroying the habitat is one of the factors that contribute to species **adaptation**.

3 Cairo Governorate — Manarat AlFarouk Islamic Language School

Answer the following questions :

Question 1

A Write the scientific term for each of the following :

1. A phenomenon that appears as brightly coloured light curtains seen at both poles of Earth.
2. The disturbed atmospheric layer.
3. Gradual decrease in the number of living organisms without compensation until all die out.
4. Elements, which have more than four electrons in their outermost energy level.
5. The weight of air column of an atmospheric height on a unit area.
6. The process of replacing the wood material of trees by silica to form petrified woods part by part.
7. The descending arrangement of metal elements according to their chemical activity.
8. Safe areas, which are established to protect endangered species in their home land.

B Give reasons for :

1. Fossils are important.
2. Ionosphere is important for radio stations.
3. Amber is considered as a suitable medium for formation of complete body fossils.

Question 2

A Write the balanced chemical equations that illustrate the following reactions :

1. Putting a piece of sodium in water.
2. Passing chlorine gas in potassium bromide solution.
3. Formation of ozone gas.

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الصف الثانى الاعدادى موقع ذاكرولى التعليمى كتاب المعاصر

B Choose the correct answer :

1. Luminous meteors are formed in ..... layer.
   a. ionosphere b. stratosphere
   c. exosphere d. mesosphere
2. The transitional elements start to appear from period .....
   a. 2 b. 3 c. 4 d. 5
3. An example of microfossils is .....
   a. mammoth. b. ferns.
   c. radiolaria. d. archaeopteryx.
4. All of the following are greenhouse gases except .....
   a. CO_2 b. O_2 c. N_2O d. CH_4

C Mention one difference between each of the following :

1. Simple ecosystem and complicated ecosystem. (Concerning the effect of extinction).
2. Group "1 A" and group "7 A".

Question 3

A Locate the position of the following elements in the modern periodic table with showing your steps :

1. $^{39}_{19}K$ 2. $^{27}_{13}Al$ 3. $^{19}_{9}F$

B Rewrite the following sentences after correcting the underlined words :

1. Barometer is used to measure the **degree of water pollution**.
2. Ferns fossils indicate that they lived in **mild environment**.
3. When the temperature of water decreases to less than **0°C**, its density decreases and, so it floats on water surface in the form of ice crystals.
4. Most halogens are **trivalent metals**.

C On electrolysis of a certain volume of acidified water, if the volume of evolved gas above the anode was 2.5 cm^3 :

1. Calculate the volume of the evolved gas above the cathode.
2. What is the name of the gas that evolves above the anode and above the cathode ?
3. Mention the name of the apparatus, which is used in this process.

Question 4

A What happens in each of the following cases ... ?

1. Storing drinking water in plastic bottles.
2. The overuse of methyl bromide as an insectiside.

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الصف الثانى الاعدادى موقع ذاكرولى التعليمى كتاب المعاصر

PART 3

B Mention one importance for each of the following :

1. Cobalt 60. 2. Stratosphere.

C Cross the odd word and write the scientific term that represents the others :

1. Dodo bird / Bald eagle / Mammoth / Quagga.
2. Lithium / Cesium / Sodium / Magnesium.
3. Halons / Nitrogen oxides / Carbon dioxide / Chlorofluorocarbon compounds.

4 Cairo Governorate — St. Joseph Maronite Language Schools

Answer the following questions :

Question 1

A Complete the following statements :

1. Mendeleev arranged the elements ascendingly according to ....., while Moseley arranged them ascendingly according to .....
2. The highest temperature layer in the atmosphere is ..... and the lowest temperature one is .....
3. Sodium is kept under the surface of ..... to prevent it from the reaction with .....

B Give reasons for each of the following :

1. Petrified woods are considered from fossils although they look like rocks.
2. The lower part of the stratosphere is suitable for flying aeroplanes.

C If the temperature at the foot of a mountain is 40°C. Calculate the temperature at its top if the height of the mountain is 3 km.

Question 2

A Write the scientific term :

1. The ability of the atom in the covalent molecule to attract the electrons of the chemical bond towards itself.
2. Traces and remains of the old living organisms that are preserved in sedimentary rocks.
3. A phenomenon that appears as brightly coloured light curtains at both the poles of the Earth.
4. Continuous decrease without compensation in the number of a certain species of living organisms until all die out.
5. The measuring unit of the degree of ozone layer.
6. Part of a million of the million part of a metre.

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B Locate the position of each element in the modern periodic table :

1. Calcium ($_{20}Ca$).
2. Sulphur ($_{16}S$).

C Mention one importance for :

1. Altimeter.
2. Troposphere layer.

Question 3

A What happens in the following situations ... ?

1. Putting a magnesium strip in a test tube containing oxygen.
2. Dissolving magnesium oxide in water.
3. The passage of electric current through Hofmann's voltameter containing acidic water.

B Compare between :

1. Mold and cast.
2. Natural and artificial water pollutants.

C Define :

1. Van-Allen belts.
2. Greenhouse effect.

Question 4

A Put (✓) or (✗) :

1. Halogens are from monovalent metals. ( )
2. Bohr had discovered the main energy levels. ( )
3. The atomic size decreases in periods as the atomic number increases. ( )
4. Each period starts with a weak metal. ( )
5. Troposphere contains most of atmospheric envelope. ( )
6. The ozone layer locates at altitude from 20 – 40 km above sea level. ( )

B Mention one example for each of the following :

1. Extinct bird.
2. Most active metal.
3. Endangered bird.
4. A complete body fossil.

C Write the symbolic chemical equations that illustrate the following reactions :

1. Dissolving carbon dioxide in water.
2. Putting a piece of sodium in water.

هذا العمل خاص بموقع ذاكرولى التعليمى ولا يسمح بتداوله على مواقع أخرى

الصف الثانى الاعدادى موقع ذاكرولى التعليمى كتاب المعاصر

PART 3

5 Cairo Governorate — East Nasr City Educational Directorate

Answer the following questions :

Question 1

A Choose the correct answer :

1. When sodium reacts with water ..... gas evolves.
   a. N_2 b. O_2 c. H_2
2. Luminous meteors are formed in ..... layer.
   a. ionosphere b. stratosphere c. mesosphere
3. Complete body fossils of insects are found preserved in .....
   a. ammounites. b. amber. c. igneous rocks.
4. The scientist ..... had discovered the main energy levels.
   a. Bohr b. Moseley c. Mendeleev
5. ..... is considered from halogens.
   a. Sodium b. Chlorine c. Helium
6. There are ..... bonds among the water molecules.
   a. metallic b. ionic c. hydrogen
7. Ozone degree is measured in a unit called .....
   a. km. b. dobson. c. mm^2.

B Give reasons for :

1. Pilots prefer to fly their planes in stratosphere.
2. Elements of the same group have similar properties.
3. Liquefied nitrogen is used in the preservation of cornea of the eye.

C Mention the importance of each the following :

1. Hofmann's voltameter.
2. Nummulites fossils.
3. Altimeter.
4. Cobalt 60.

Question 2

A Put (✓) sign or (✗) sign in front of the following sentences :

1. Water and ammonia are from polar compounds. ( )
2. Methyl bromide gas is used as an insecticide. ( )
3. Mendeleev arranged the elements ascendingly according to their atomic number. ( )
4. Ferns fossils indicate that the environment where they lived was a sea floor. ( )
5. Dodo bird and Quagga are from extinct species in the recent time. ( )

B Problem : Calculate the height of a mountain if the temperature at its base is 30°C at its top is (–9°C).

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C Compare between each in the following :

1. Simple ecosystem and complicated ecosystem. (Example)
2. Basic oxides and acidic oxides. (According to dissolving in water)
3. Group (1 A) and group (7 A). (Related to its name)

Question 3

A Write the scientific term for each in the following :

1. It is the continuous decrease without compensation in the number of a certain species of living organisms until all members of species die out.
2. It is a series in which metals are arranged in descending order according to their chemical activity.
3. It is the continuous increase in the average temperature of the Earth's near-surface air.
4. They are traces and remains of old living organisms that are preserved in sedimentary rocks.
5. It is used to measure the atmospheric pressure.
6. They indicate the age of sedimentary rocks existed in them.
7. It is the number of protons inside the nucleus of the atom of an element.

B Complete and balance the following equations :

1. $Mg + \text{.....} \xrightarrow{\text{dil.}} MgCl_2 + H_2\uparrow$
2. $CO_2 + H_2O \longrightarrow \text{.....}$
3. $Br_2 + 2\,KI \longrightarrow \text{.....} + \text{.....}$

C What will happen in each of the following cases ... ?

1. Storing water in plastic bottles.
2. Overuse of freon.
3. Eating fish contains high concentration of lead.

Question 4

A Complete the following statements :

1. The modern periodic table consists of ..... horizontal periods and ..... vertical groups.
2. Archaeopteryx is the link between ..... and .....
3. The highest temperature layer in the atmosphere is ..... and the lowest temperature one is .....
4. Fossils are used in petroleum ..... and determining the age of .....
5. Sodium is kept under the surface of ..... to prevent it from the reaction with .....

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PART 3

B Give one example for :

1. Complete body fossil.
2. A natural protectorate.

C Locate the position of the following elements in the modern periodic table :

1. $_{17}Cl$
2. $_{20}Ca$

6 Cairo Governorate — Maadi Educational Directorate

Answer the following questions :

Question 1

A Complete each of the following statements :

1. The highest temperature atmospheric layer is ....., while the lowest temperature atmospheric layer is .....
2. ..... and ..... are examples of extinct animals.
3. From the pollutants of the ozone layer are ..... and .....
4. During the electrolysis of acidified water by Hofmann's voltameter, the ..... gas evolves at the anode, while the ..... gas evolves at the cathode.

B What is meant by each of the following ... ?

1. Chemical activity series.
2. Fossils.

Question 2

A Choose the correct answer :

1. All of the following are from the greenhouse gases except .....
   a. CO_2 b. N_2O c. O_2
2. Halogens are ..... non-metals.
   a. monovalent b. divalent c. trivalent
3. Meteors are burned in the .....
   a. ionosphere. b. mesosphere. c. stratosphere.
4. The first protectorate established in Egypt is ..... protectorate.
   a. Bluestone b. Panda c. Ras Mohamed

B Give reasons for :

1. The presence of hydrogen bond between water molecules.
2. The simple ecosystem is affected strongly at the absence of one of its species found in it.
3. The lower part of the stratosphere is suitable for flying the aeroplanes.

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Question 3

A Write the scientific term :

1. The scientist who discovered that the nucleus of the atom contains positively charged protons.
2. The fossils that are found in the limestone rocks of Mokattam mountain indicate that it was a sea floor since more than 35 million years ago.
3. Group of food chains connected with each other.
4. The ability of the atom in covalent molecule to attract the electrons of the chemical bond towards itself.

B Locate the position of each of the following elements in the modern periodic table :

1. $_{18}Ar$ 2. $_{7}N$

C Write balanced chemical equation representing each of the following :

1. The reaction between magnesium and dilute hydrochloric acid.
2. The reaction between chlorine and potassium bromide.

Question 4

A Correct the underlined words :

1. Mendeleev arranged the elements according to their **atomic number**.
2. **Mammoth** fossil is an example of microfossils.
3. Dobson assumed that the natural amount of the ozone equals **100** Dobson units.
4. Alkali metals are **bad** conductors of heat and electricity.

B Mention the use (importance) of each of the following :

1. Liquefied nitrogen. 2. Van-Allen belts.

C Calculate the temperature at the top of a mountain, if the temperature at the mountain base is 36°C and its height is 4 km.

7 Giza Governorate — Lycee El-Haram Language School

Answer the following questions :

Question 1

A Complete the following sentences :

1. Fossils are often found in ..... rocks.
2. The alkali metal elements are ..... valent.
3. $Mg + 2HCl \longrightarrow$ ..... + ...
4. Bromine replaces ..... in its salt solution.

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PART 3

5. Element $_2X$ is located in group ..... in the modern periodic table.
6. Eating fish which contains high ratios of lead causes .....
7. The nanometer = ... m.

B Give reasons for :

1. The global warming has a dangerous effect over the Earth.
2. El-Mokattam's mountain was once a sea floor more than 35 million years ago.

Question 2

A Choose the correct answer for the following statements :

1. Scientist ..... discovered the main energy levels in the atom.
   a. Bohr b. Mendeleev c. Moseley d. Hofmann
2. Aluminium oxide from ..... oxides.
   a. amphoteric b. acidic c. nonmetallic d. basic
3. An example of extinct species .....
   a. panda bear. b. rhinoceros. c. quaga. d. papyrus plant.
4. All are greenhouse gases except .....
   a. CO_2 b. O_2 c. N_2O d. CH_4
5. The air moves ..... in the stratosphere layer.
   a. horizontally b. vertically c. whirlwind motion d. no correct answer
6. All the following elements from semimetals except .....
   a. tellurium. b. silicon. c. boron. d. bromine.
7. There are ..... bonds in a sample of water.
   a. covalent b. hydrogen c. ionic d. covalent and hydrogen

B Calculate the height of a mountain if the temperature at its foot is 30°C and at its top is (–9°C).

Question 3

A Correct the underlined words in the following statements :

1. **Insect in amber** is an example of micofossils.
2. Each period in the periodic table ends with **a metal**.
3. **Bald eagle** is from the birds that can't fly because of its small wings.
4. The elements of block **(P)** are organized in 10 groups in the periodic table.
5. **Sodium** is considered as the most active metal in the periodic table.

B Compare between each of the following :

1. Mold and trace. (In view of their definitions and example for each)
2. Aneroid and altimeter. (In view of their usage)

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Question 4

A Write the scientific term for each of the following statements :

1. It is the ability of an atom in the covalent compound to attract the bonded electrons to itself.
2. Fossil links between reptiles and birds.
3. Phenomenon appears as brightly coloured light curtains at both the north and the south poles of the Earth.
4. Continuous increase of the average temperature of the air near the surface of the Earth.
5. A kind of water pollution results from mixing of humans and animals wastes with water.
6. Measuring unit of ozone degree.

B Mention one importance :

1. Liquefied nitrogen. 2. Ozone layer. 3. Index fossils.

C Explain the effect of extinction of a species of living organisms on simple ecosystem and complicated ecosystem.

8 Giza Governorate — Talaee Islamic Language School

Answer the following questions :

Question 1

A Complete the following statements :

1. The number of groups in p-block is ..... in modern periodic table.
2. Sodium reacts with water to produce ..... gas.
3. From the pollutants of ozone layer are ..... , ... , ... and .....
4. The measuring unit of atmospheric pressure is ....., while the measuring unit of ozone degree is .....

B Calculate the temperature at the sea level if the temperature at height of 7500 m above sea level is (–15°C).

C What's meant by ... ?

1. Greenhouse effect. 2. Fossils.

Question 2

A Write the scientific term for each of the following statements :

1. Element, which is used in food preservation.
2. The region in which satellites orbit around the Earth planet.
3. It is the curved lines that join the points of equal pressure in atmospheric pressure maps.

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PART 3

4. Two magnetic belts surrounding ionosphere and play an important role in scattering harmful charged cosmic radiation.
5. A bond that exists between water molecules.

B How can you differentiate between each of the following ... ?

1. Copper and magnesium. (Use a balanced equation)
2. Carbon dioxide and sodium oxide.

Question 3

A Choose the correct answer :

1. Fossils are found in ..... rocks.
   a. metamorphic b. sedimentary c. igneous d. no correct answer
2. ..... is from the recent extinction animal.
   a. Mammoth b. Panda bear c. Quagga d. Bald eagle
3. Meteors are formed in ..... layer.
   a. ionosphere b. stratosphere c. mesosphere d. troposphere
4. The devices, which is (are) used in measuring the atmospheric pressure is (are) .....
   a. ammeter. b. aneroid. c. altimeter. d. (b) and (c).

B Mention one difference between :

1. Mold and cast.
2. Positive ion and negative ion.

C Mention by the chemical equation the effect of adding :

1. Bromine to potassium iodide.
2. Dilute hydrochloric acid to carbon.

Question 4

A Give reasons for :

1. Occurrence of old extinction.
2. Ozone layer is formed in stratosphere.
3. Elements of the same group have similar chemical properties.
4. Pure water has no effect on litmus paper.

B Locate the position of the following element in the modern periodic table :

1. $(_{2}X)$ 2. $(_{20}Y)$ 3. $(_{8}Z)$

C Put (✓) in front of the correct statements and or (✗) in front of the wrong ones and correct the incorrect ones :

1. Water and ammonia are non-polar compounds. ( )
2. Eating fish which contain high percentage of lead causes blindness. ( )
3. Liquefied sodium is used in the preservation of the eye cornea. ( )

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Final Examinations

9 Giza Governorate — Official Language Schools

Answer the following questions :

Question 1

A Complete the following sentences :

1. Mendeleev arranged the elements ascendingly according to ....., while Moseley arranged them ascendingly according to .....
2. The highest temperature layer in the atmosphere is ..... and the lowest temperature one is .....
3. ..... bear is one of the most endangered species.
4. Elements of group (1A) are called .....
5. Ultraviolet rays (UV) have ..... effect, while infrared rays have ..... effect.
6. Most of weather features occur in ..... layer.

B Locate the position of these elements in the modern periodic table :

1. $_{20}Ca$ 2. $_{10}Ne$

C Mention one example for each of the following :

1. A metalloid element. 2. A greenhouse gas. 3. Extinct species.

Question 2

A Write the scientific term for each of the following :

1. The death of all members of species of living organisms.
2. The metalloid that is used in manufacture of electronics such as computer.
3. A phenomenon that appears as brightly coloured light curtains at the north and south poles of Earth.
4. The elements which have the properties of both metals and nonmetals.
5. The arrangement of elements in a descending order according to their chemical activity.
6. Two magnetic belts that help in scattering of harmful cosmic radiations away from the Earth.

B Mention one use for each of the following elements in modern technology :

1. Cobalt 60. 2. Altimeter 3. Ozone layer

C If the temperature at the sea level equals 30°C, find the temperature at a height of 4 km. above the earth's surface.

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PART 3

Question 3

A Give reasons for :

1. Elements of the same group have similar chemical properties.
2. The lower part of the stratosphere is suitable for flying aeroplanes.
3. Water has high boiling point and high freezing point.
4. El-Mokattam's mountain was a sea floor more than 35 million years ago.

B Choose the correct answer :

1. The degree of ozone is measured by ..... unit.
   a. picometre b. par c. dobson
2. ..... represents the link between reptiles and birds.
   a. Archaeopteryx b. Fish c. Quagga
3. ..... protectorate is the first established natural protectorate in Egypt.
   a. Saint Cathrine b. Ras Mohamed c. Wadi Hetan
4. Sodium oxide from ..... oxides.
   a. amphoteric b. acidic c. basic
5. Each period in the modern periodic table starts with (a/an) ..... element.
   a. metallic b. inert c. nonmetallic
6. Meteors are formed in .....
   a. ionosphere. b. mesosphere. c. stratosphere.
7. The strongest metal locates in the ..... group.
   a. 2 A b. 1 A c. 7 A
8. All of the following are endangered species except .....
   a. panda bear. b. bald eagle. c. dodo bird.

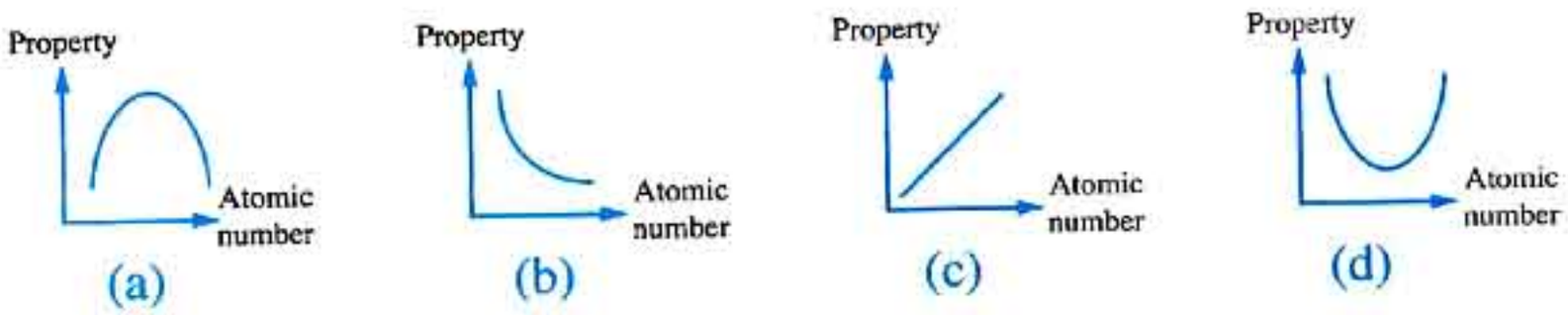
Question 4

A Put (✓) or (✗) :

1. Ozone layer is formed in troposphere layer. ( )
2. Halons are from the pollutants of ozone layer. ( )
3. Fossils are used to indicate the age of sedimentary rocks. ( )
4. The satellites revolve around the Earth in a region called the troposphere. ( )
5. Modern periodic table consists of 7 groups and 16 periods. ( )
6. Water and ammonia are from polar compounds. ( )
7. The solutions produced from dissolving the non-metal oxides in water turn the violet litmus solution into red. ( )
8. Tropical forest is an example of simple ecosystem. ( )

B Which of the following figures represents ... ?

Graduation of the atomic size in the third period.



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10 Giza Governorate — Pyramids Language Schools

Answer the following questions :

Question 1

A Write the scientific term :

1. Elements which have the properties of both metals and nonmetals.
2. Series in which metals are arranged in a descending order according to their chemical activity.
3. Thinning or losing parts of ozone layer above the south pole.
4. It is a region in which the atmospheric envelope is inserted with outer space.
5. They are safe areas established to protect endangered species in their homeland.

B Mention one function for :

1. Van-Allen belts.
2. Liquefied nitrogen.

C Choose the odd word from the following :

1. Nitrogen oxides - Water vapour - Halons - Methyl bromide.
2. Quagga - Dodo bird - Dinosaur - Bald eagle.

Question 2

A Complete the following :

1. Both sodium ($_{11}$Na) and potassium ($_{19}$K) are located in the same ..... because they have the same number of .....
2. Mesosphere layer is highly rarefied because it contains limited quantities of ..... and ..... gases only.
3. Water has the ability to dissolve some of covalent compounds such as ....., because it can form ..... bond with water molecules.
4. ..... is a type of barometer used to determine the day weather, while ..... is used to measure the elevation from sea level.

B Give reasons for :

1. By increasing the atomic number among groups, the atomic size increases.
2. Adding few drops of dilute sulphuric acid to water during its electrolysis by Hofmann's voltameter.

C Mention one harm for the following :

1. Global warming.
2. Biological pollution.

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PART 3

Question 3

A Correct the underlined word :

1. Elements of group 1A are known as **halogens**.
2. **Covalent** bond is a weak electrostatic attraction force which arises among water molecules.
3. **Mammoth** is one of the examples of petrified fossils.
4. **Coral** fossils indicate that the environment where they lived was hot and rainy tropical environment.

B Problem : Calculate the height of a mountain if temperature at its base is 30°C and at its top is – 9°C .

C What will happen if ... ?

1. Adding some water to magnesium oxide followed by drops of violet litmus solution.
2. The resinous matter, which was secreted by pine trees falls on an insect.

Question 4

A Choose the correct answer :

1. Most of alkali metals have ..... density.
   a. low b. high c. same
2. The scientist who discovered that the nucleus of the atom contains positively particles is .....
   a. Mendeleev. b. Bohr. c. Rutherford.
3. Pilots prefer to fly their planes in .....
   a. exosphere. b. stratosphere. c. thermosphere.
4. ..... is one of the most important reasons of the recent extinction age.
   a. Volcanic eruption b. Long glacial age c. Overhunting
5. The unit which used to measure ozone degree is .....
   a. Dobson. b. millibar. c. nanometer.

B Compare between simple and complicated ecosystems (definition only).

C Complete the following equations :

1. $2H_2O \xrightarrow{\text{Electrolysis}}$ ..... + ...
2. $Br_2 + 2KI \longrightarrow$ ..... + ...

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Final Examinations

11 Alexandria Governorate — East Educational Zone

Answer the following questions :

Question 1

A Complete the following statements :

1. Mendeleev discovered that the atomic weights of element increase on moving from ..... side of the table to the ..... side in horizontal row, which were later called .....
2. Non-metal oxides dissolve in water forming ....., which turn the litmus solution into .....
3. Mesosphere layer is much vacuumed as it contains limited amount of ..... and ..... gases.
4. The atmospheric pressure ..... by increasing the length of air column.
5. Fluorine and chlorine exist in a ..... state, while iodine exists in a ..... state.

B What is meant by ... ?

1. Aurora phenomenon.
2. Electronegativity.

C Write the symbolic balanced chemical equations that illustrate the following reactions :

1. Reaction of chlorine gas with potassium bromide solution.
2. Reaction of sodium with water.

Question 2

A Write the scientific term :

1. What an old living organisms left during its life indicating its activity.
2. The region between stratosphere and mesosphere and at which the temperature remains constant.
3. A charged layer, which reflects radio waves.
4. The continuous increase in the average temperature of the Earth's near-surface air.
5. Elements, which have the properties of metals and nonmetals.
6. Fossils used in determination of the age of sedimentary rocks.

B Locate the position of the following elements in the modern periodic table :

1. $_{19}K$ 2. $_{2}He$

C Find temperature at a point of height 10000 meters above sea level if temperature at the sea level is 24 C.

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PART 3

Question 3

A Choose the right answer :

1. Magnesium oxide is considered as ..... oxides.
   a. acidic b. nonmetallic c. basic d. metallic
2. Complete body fossils of insects are found preserved in .....
   a. amber. b. ammonites. c. igneous rocks. d. mammoth.
3. All of the following cause erosion of ozone layer except .....
   a. aerosols. b. freon. c. nitrogen oxides. d. iron oxides.
4. Satellites orbit in ..... of the Earth.
   a. exosphere b. thermosphere c. mesosphere d. stratosphere
5. All are greenhouse gases except .....
   a. CO_2 b. CH_4 c. N_2O d. O_2
6. The atmospheric pressure on the top of a mountain is ..... the atmospheric pressure at the sea level.
   a. less than b. more than c. equal to d. half

B Give reasons for :

1. Elements of the same group have similar properties.
2. Ozone layer acts as a protective shield for living organisms.

C Mention the importance of :

1. Halons.
2. Cobalt 60

Question 4

A Put (✓) or (✗) each of the following and correct the wrong ones :

1. Hofmann's voltammeter is used for water ionization. ( )
2. Water molecules are linked together by ionic bond. ( )
3. Sodium is used in the preservation of the eye cornea. ( )
4. Meteors are burnt in thermosphere layer. ( )
5. Dobson is the unit of measuring the ozone degree. ( )

B Fill the missing spaces in the table :

Water pollution	Kind of pollution	Harms
1. Discharging of factories wastes in rivers.	.....	Blindness.
2.	Biological pollution.	.....
3. Using some water areas in cooling of nuclear reactors.	.....	Destruction of the marine organisms.

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12 Alexandria Governorate — El-Agamy Educational Zone

Answer the following questions :

Question 1

A Complete the following statements :

1. Mendeleev arranged the elements ascendingly according to ....., while Moseley arranged them ascendingly according to .....
2. Ultraviolet rays have ..... effect, while infrared rays have ..... effect.
3. The highest temperature layer in the atmosphere is ..... and the lowest temperature one is .....
4. ..... and ..... are metals, which don't react with water.
5. Archaeopteryx represent the link between ..... and .....

B Give one use for :

1. Cobalt 60.
2. Van-Allen belts.

Question 2

A Write the scientific term :

1. Elements having the properties of metals and nonmetals.
2. A water pollutant which causes the death of brain cells.
3. Traces and remains of old living organisms that are preserved in sedimentary rock.
4. A charged layer reflect radio waves.
5. A phenomenon that appear as bright colours at the two poles.

B Find the temperature at the top of a mountain its height is 3 km, if temperature at the sea level is 20°C.

Question 3

A Choose the correct answer :

1. All the following are endangered species except .....
   a. panda bear. b. bald eagle. c. quagga. d. rhinoceros.
2. From gaseous elements in group (7 A) is (are) .....
   a. chlorine. b. iodine. c. fluroine. d. (a) & (c) together.
3. The ozone degree is measured in a unit called .....
   a. km. b. °C. c. Dobson. d. millibar.
4. Complete body fossils of insect are found preserved in .....
   a. ammonites. b. amber. c. snow. d. igneous rock.
5. Meteors are formed in ..... layer.
   a. mesosphere b. ionosphere c. exosphere d. stratosphere

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PART 3

B Locate the position of the following elements in the modern periodic table :

1. $_{19}K$ 2. $_{10}Ne$

Question 4

A Correct the underlined words :

1. Each period ends with **a nonmetal**.
2. If the metal lost one electron or more, it will become a **negative** ion.
3. **The desert environment** is an example of the complex ecosystem.

B Give reasons for :

1. Water and ammonia are polar covalent compounds.
2. The atomic size increases through group.

C Write the balanced chemical equations representing each of the following :

1. Magnesium with hydrochloric acid.
2. Reaction of sodium with water.

13 Alexandria Governorate — Montazah Educational Zone

Answer the following questions :

Question 1

A Complete the following sentences :

1. Ozone layer locates in ..... layer.
2. Radiolaria fossil is an example of ..... , but amber fossil is an example of .....
3. There are ..... bonds between molecules of water.
4. $2H_2O \xrightarrow{\text{Electrolysis}}$ ..... + ...
5. ..... is an instrument used to determine the possible day weather, but ..... to analysis the water by electricity.
6. Ultraviolet radiation has a ..... effect, and the infrared radiation has a ..... effect.

B What is meant by ... ?

1. Protectorate.
2. Chemical Activity Series.

C What is the importance of ... ?

1. Liquefied nitrogen.
2. Co 60

Question 2

A Choose the correct answer :

1. Scientist ..... discovered the main energy levels in atom.
   a. Bohr b. Mendeleev c. Moseley

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2. Sodium oxide is from ..... oxides.

a. amphoteric b. acidic c. basic

3. When water freezes, its density .....

a. increases. b. decreases. c. doesn't change.

4. When sodium react with water ..... gas evolves.

a. O_2 b. CO_2 c. H_2

B What is the result of the following ... ?

1. Presence of Van-Allen belts. 2. Storing water in plastic bottles.

C Calculate the height of the mountain if the temperature at the base is 30°C and at its top is – 6°C.

Question 3

A Write the scientific term :

1. The vertical columns in Mendeleev's table.
2. The region where the atmospheric envelope is inserted in outer space.
3. A solid halogen.

B Write the symbolic balanced chemical equations that illustrate the following reactions :

1. Magnesium with dill hydrochloric acid.
2. Chlorine gas with potassium bromide solution.

C Study the opposite figure, then answer :

	A	
	$_{11}$B	E
	C	
	D	

1. Locate the position of element $_{11}$B
2. What are the atomic number of elements E, C in modern periodic table ?

Question 4

A Put (✓) or (✗) and correct :

1. The air moves horizontally in the lower part of the stratosphere. ( )
2. Copper metal doesn't react with water. ( )
3. Halogens are monovalent metals. ( )
4. The unit of measuring atomic radius is Dobson unit. ( )

B Give reasons for :

1. Ammonia is considered as a polar covalent compound.
2. The atomic size of $_{11}$Na is greater than $_{17}$Cl.

C Explain the role of ultraviolet rays in formation of ozone gas.

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PART 3

14 El-Qalyoubia Governorate — Memphis Language School

Answer the following questions :

Question 1

A Complete the following sentences :

1. $2H_2O \longrightarrow$ ..... + ...
2. Lithium and sodium ..... on the surface of water as their densities are ..... than water density.
3. There are three types of ultraviolet rays, near ultraviolet rays ..... and .....
4. The atmospheric envelope height above sea level is ....., while normal atmospheric pressure equals ..... millibar.
5. ..... + ... $\longrightarrow MgCl_2 + H_2$

B Locate the position of the following elements in the modern periodic table :

1. $_{13}Al$ 2. $_{10}Ne$ 3. $_{17}Cl$

C Compare between the following :

Old extinction and recent extinction (concerning its causes).

Question 2

A Write the scientific term, which refers to each of the following statements :

1. The descending arrangement of elements according to their chemical activities.
2. A phenomenon that appears as brightly coloured light curtains at both the poles of the Earth.
3. Remains or traces of organisms that lived in the past were preserved in sedimentary rocks.
4. Continuous decrease in the number of species without compensation until all die out.

B Write the balanced chemical equations representing the following reactions :

1. The reaction between magnesium and dilute hydrochloric acid.
2. The reaction between bromine with potassium iodide.
3. The electrolysis of water.

C Calculate the height of a mountain if the temperature at its base is 30°C and at its top is (– 9°C).

Question 3

A Choose the correct answer :

1. The scientist ..... had discovered the main energy levels.
   a. Moseley b. Bohr c. Hofmann d. Mendeleev

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2. The modern periodic table consists of ..... horizontal periods.
   a. 7 b. 10 c. 14 d. 18
3. Atmospheric pressure is the ..... of air column of an atmospheric height on a unit area.
   a. mass b. volume c. weight d. density
4. Ozone layer is found in ..... layer.
   a. troposphere b. stratosphere c. mesosphere d. thermosphere
5. ..... is an example of microfossils.
   a. Mammoth b. Ferns c. Foraminifera d. Archaeopteryx

B Give reasons for :

1. Sodium is kept under the surface of kerosene.
2. Liquefied nitrogen is used in the preservation of cornea of the eye.
3. The continuity of the ozone layer erosion.

C What is meant by ... ?

1. Polar compound.
2. Water pollution.

Question 4

A Correct the underlined words :

1. Each period ends with **a nonmetal**.
2. **Chemical** pollution of water causes many diseases as typhoid and hepatitis.
3. Infrared radiation has a **chemical** effect.
4. Panda bear is considered from **extinct** species.
5. Ozone degree is measured in a unit **nanometer**.

B Mention one example for :

1. Petrified fossils.
2. Natural protectorate found in South Sinai in Egypt.
3. An alkali metal that is kept under surface of paraffin oil only.

C What happens when ... ?

1. Adding the purple sunflower solution to a jar has a piece of burning coal.
2. The pollution of water with animals and human wastes.

15 Sharkia Governorate — Formal Language Schools

Answer the following questions :

Question 1

A Complete the following sentences :

1. From the extinct animals in the old ages ..... and .....

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PART 3

2. Ultraviolet radiation has a ..... effect and the infrared radiation has a ..... effect.
3. The bond between oxygen and hydrogen atoms in water molecule is ....., while bond among water molecules are .....
4. Fossils are used in ..... exploration and determining the age of .....

B Give reasons for :

1. Liquefied nitrogen is used in the preservation of the eye cornea.
2. Elements of group 1A are known as alkali metals.

C What is the importance of ... ?

1. Altimeter. 2. Liquid sodium.

Question 2

A Write the scientific term :

1. A series in which metals are arranged in a descending order according to their chemical activity.
2. A kind of elements in which their valence electrons contain less than 4 electrons.
3. The continuous decrease in the number of individuals of the species of organisms without compensation.
4. A phenomena appears as brightly coloured lighted curtains at both poles of the Earth.

B What is meant by ... ?

1. Fossils. 2. Metalloid.

C Locate the position of the following elements in the modern periodic table :

1. $_{11}Na$ 2. $_{20}Ca$ 3. $_{3}Li$

Question 3

A Choose the correct answer :

1. The elements which occupy the middle block(d) in the periodic table .....
   a. alkali metals. b. transition elements. c. inert elements. d. halogens.
2. The ozone hole increases in ..... of each year.
   a. October b. September c. December d. January
3. The hottest atmospheric layer is the .....
   a. troposphere. b. stratosphere. c. mesosphere. d. thermosphere.
4. The scientist who discovered the main energy level is .....
   a. Mendeleev. b. Bohr. c. Moseley. d. Rutherford.
5. Fossils are often found in ..... rocks.
   a. metamorphic b. sedimentary c. volcanic d. igneous

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B Write the symbolic chemical equations for the following reactions :

1. Dissolving of magnesium oxide in water.
2. The reaction between chlorine gas and potassium bromide.
3. The electrolysis of water.

C Calculate the height of mountain if the temperature at its foot is 30°C and at its top is (–9°C).

Question 4

A Put (✓) or (✗) and correct the wrong ones :

1. The number of known elements till now is 92 elements. ( )
2. Each period starts with a weak metal. ( )
3. The pilots prefer to fly in mesosphere. ( )
4. Papyrus is considered as an extinct plant. ( )

B Compare between troposphere and mesosphere layers.

C Explain the effect of extinction of species of living organisms on :

1. Simple ecosystem.
2. Complicated ecosystem.

Answer the following questions :

Question 1

A Write the scientific term for each of the following :

1. The elements which have the properties of both metal and nonmetal.
2. The ability of the atom to attract the electrons of the chemical bond to itself.
3. A molecule is formed from combining an atom of element with molecule of the same element.
4. They are traces and remains of old living organisms that are preserved in sedimentary rocks.
5. Weight of air column of an atmospheric height on unit area.
6. They are safe areas established to protect endangered species in their homeland.

B Locate the position of the following in the modern periodic table :

(Period, group and its block)

1. $_{2}X$
2. $_{9}Y$

C Answer the following :

1. If the temperature at the sea level is 30°C, Calculate the temperature at a height of 500 m.
2. Write the balance chemical equation which express :
   (a) Reaction of bromine with potassium iodide.
   (b) Electrolysis of water.

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PART 3

Question 2

A Complete the following sentences :

1. ..... and ..... are from greenhouse gases.
2. Mendeleev arranged the elements ascendingly according to their ....., while Moseley arranged the elements ascendingly according to their .....
3. Archaeopteryx represents the link between ..... and .....
4. The ultraviolet radiations have a ..... effect, while the infrared radiations have a ..... effect.
5. The type of bond in the water molecule is ....., while the bond between water molecules is .....

B Give reasons for :

1. The high boiling point of water.
2. Stratosphere layer is important for human's life.
3. Dodo bird was an easy target for hunters.
4. Element in the same group have similar chemical properties.

C Mention one example of :

1. Basic oxide.
2. A petrified fossil.
3. Halogen in liquid state.

Question 3

A Choose the odd word out, then write the scientific term for the rest words :

1. Nitrogen oxide / Water vapour / Freon / Halon.
2. Ibis bird / Dodo bird / Panda bear / Bald eagle.
3. Floods / Forests fire / Drought waves / Ozone hole.

B Mention the importance of :

1. Barometer.
2. Nummulite fossils.
3. Cobalt 60.
4. Van-Allen belt.

C What happens when ... ?

1. There is no ionosphere layer at the end of thermosphere.
2. Decreasing water temperature to less than 4°C.
3. Increasing atomic number in period three (concerning the metallic and non-metallic property).

D What is meant by ... ?

1. Global worming phenomenon.
2. Polar compound.
3. Fossil record.
4. Chemical Activity Series.

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Question 4

A Choose the correct answer :

1. From microfossils .....
   a. ferns. b. foraminifera. c. radiolaria. d. (b) and (c).
2. Increasing the concentration of ..... in drinking water cause blindness.
   a. lead b. arsenic c. mercury d. chlorine
3. The temperature at the top of mesosphere layer reachs .....
   a. 100°C b. – 60°C c. – 90°C d. 1200°C
4. Ozone layer allows 100% of ..... ultraviolet rays to penetrate.
   a. near b. medium c. far d. (a , b)
5. Complete body fossils of insects found preserved in .....
   a. ammonites. b. igneous rocks. c. snow. d. amber.
6. Atmospheric pressure at tropopause equal ..... mb.
   a. 100 b. 1000 c. 0.01 d. 0.001

B Put (✓) or (✗) and correct the wrong ones :

1. Overuse of methyl bromide as insecticide causes increasing of erosion of ozone layer. ( )
2. Hydrogen evolves at positive pole in Hofmann's voltameter. ( )
3. Burning carbon produces basic oxide. ( )
4. Coral fossils indicate that their environment was clear warm shallow seas. ( )

C Answer the following :

1. Compare between fluorine and cesium.
   (Concerning the atomic size and the kind of the formed ion)
2. What are the reasons of the extinction in recent ages ? (Write two reason only)

17 Ismailia Governorate — Science Inspectorate

Answer the following questions :

Question 1

A Complete the following sentences with suitable words :

1. The suitable medium to from a mammoth fossil is .....
2. Mendeleev arranged the elements in an ascending order according to their ....., while Mosely arranged them ascendingly according to .....
3. Fluorine and chlorine are found in ..... state.
4. ..... is the first protectorate established in Egypt.

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PART 3

5. From the pollutants of ozone layer are ..... compounds that are used in air conditioner sets.
6. Increasing the concentration of mercury in drinking water causes .....
7. The highest temperature layer in the atmosphere is the ....., while the ..... layer is the most thin one.
8. Metal oxides are ..... oxides, while nonmetal oxides are ..... oxides.

B Write the number which indicates each of the following :

1. The number of blocks in the modern periodic table.
2. The number of oxygen atoms in ozone molecule.
3. The normal atmospheric pressure at the sea level (in mb).

Question 2

A Give reasons for :

1. Ozone layer is formed in stratosphere.
2. Petrified woods are considered as fossils although they look like rocks.
3. The atomic size of the elements of the same group increases by increasing their atomic number.
4. The simple ecosystem is affected strongly by the absence of one of its species.

B Write the scientific term :

1. The continuous increase in temperature of the Earth's near-surface air.
2. A series in which metals are arranged in a descending order according to the chemical activity.
3. The region between stratosphere and mesosphere at which temperature remains constant.
4. The radioactive element used in food preservation.

C Complete the following equations :

1. $2Na + 2HOH \longrightarrow ..... + H_2$
2. $Br_2 + 2KI \longrightarrow ..... + I_2$

Question 3

A Choose the correct answer for the following :

1. All the following metals react with water except .....
   a. K b. Cu c. Na d. Mg
2. Ozone layer doesn't allow the passage of ..... ultraviolet rays.
   a. near b. medium c. far d. no correct answer
3. There are ..... bonds between water molecules.
   a. hydrogen b. covalent c. ionic d. all the previous

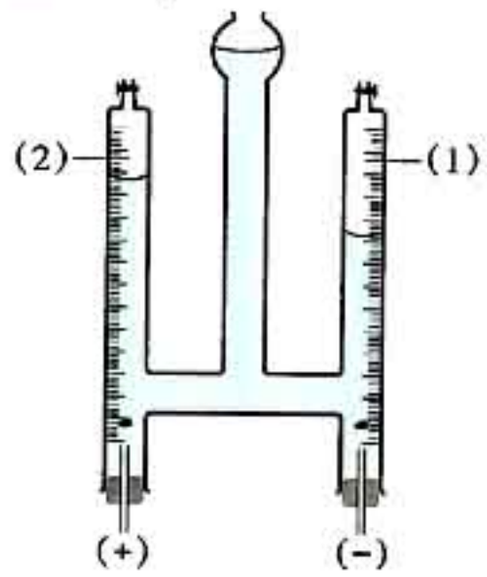
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4. Ionosphere is surrounded by ..... belts.
a. electric b. magnetic c. thermal d. no correct answer

5. Fossils are found in ..... rocks.
a. igneous b. sedimentary c. metamorphic d. all the previous

6. All the following gases are greenhouse gases except .....
a. CO_2 b. O_2 c. N_2O d. CH_4

B From the opposite figure, answer the following questions :



1. This apparatus is called .....
2. Label the figure.
3. Find the volume of gas (1) if the volume of gas (2) is 10 cm^3

C Locate the position of each of the following in the modern periodic table :

1. $_{12}Mg$ 2. $_{19}K$

Question 4

A Put (✓) in front of right statement and (✗) in front of wrong one :

1. Establishing gene banks is a way to protect living organisms from extinction. ( )
2. Chemical activity of group 1 A elements increases as atomic size increases. ( )
3. Water molecule is a non-polar compound. ( )
4. Ferns fossils indicate that the environment where they lived was a sea floor. ( )
5. Methyl bromide gas is used as insecticide. ( )
6. Density of ice is more than that of water. ( )
7. Stratosphere is the coldest layer in the atmosphere. ( )

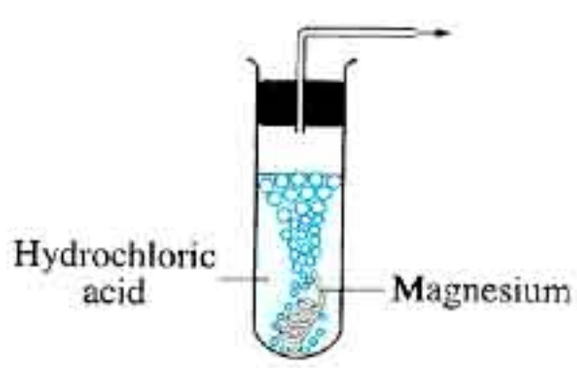
B Mention one example of the following :

1. Old extinct animal. 2. Endangered plant. 3. Alkali metal element.

C If the temperature at the base of a mountain is 40 C° , find the temperature at its top if its height is 2 Km.

D Examine the figure, then answer the questions :

1. Write the chemical equation represents the reaction.
2. What the name of the produced gas ?



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PART 3

18 Port-Said Governorate — El-Qadessia Languge School

Answer the following questions :

Question 1

A Complete the following phrases :

1. The type of bond in the water molecule is ....., while the bond between water molecules is .....
2. $Cl_2 + 2\,KBr \longrightarrow$ ..... + ...
3. Fossils are used in ..... exploration and determining the age of .....
4. Carbon dioxide gas is ..... oxide, while magnesium oxide is ..... oxide.

B Calculate the height of a mountain given that the temperature at its base = 40°C and at its top = −12°C.

C Give reasons for :

1. Water and ammonia are polar compounds.
2. Cobalt 60 is used in the food preservation.
3. Ionosphere layer is important for radio stations.

Question 2

A Write the scientific term for each of the following statements :

1. The traces and remains of the old living organisms which are preserved in sedimentary rocks.
2. The elements that have the properties of metals and nonmetals.
3. They are two belts surround ionosphere and help in scattering the harmful cosmic radiations.
4. Safe places that are specified to protect the endangered species in their natural environment.

B Locate the position of each element in the modern periodic table :

1. ($_{20}$Ca) 2. Sulphur ($_{16}$S) 3. ($_{2}$He)

C Compare between group (1A) and group (7A).

(according to : Name - valency - kind of formed ions)

Question 3

A Choose from column (B) what suits column (A) :

(A)	(B)
1. Altimeter	a. the layer that has all weather phenomena.
2. Thermosphere	b. a suitable layer for aeroplanes flying.
3. Troposphere	c. a device used to measure the altitude of planes.
4. Stratosphere	d. the hottest layer in the atmospheric envelope.

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B What happens when ... ?

1. Drinking water polluted with mercury.
2. Increasing the ratio of greenhouse gases in the atmosphere.
3. Adding the violet litmus solution to a jar has a piece of burning coal. (write the symbolic balanced equation).

C Put (✓) in front of the correct statement and (✗) in front the incorrect one, then correct the wrong ones :

1. Panda bear is an example of extinct species. ( )
2. The main energy levels had discovered by Bohr. ( )
3. Ultraviolt radiation has a thermal effect. ( )
4. The mold is a copy of external shape of the shell. ( )

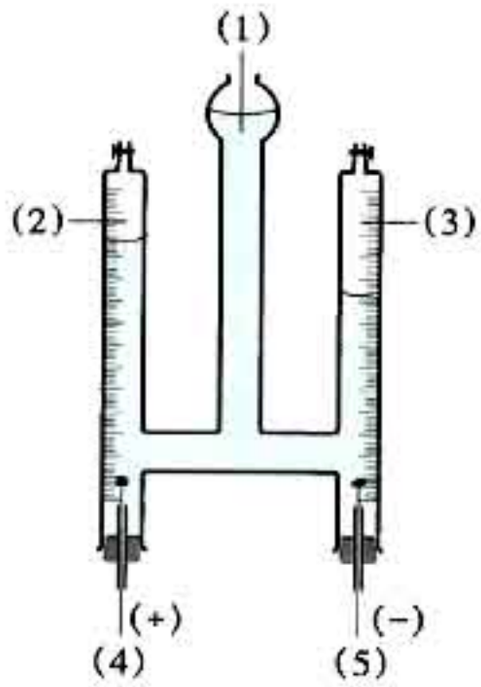
Question 4

A Choose the correct answer for the following :

1. ..... is an example of complete body fossils.
   a. Mammoth b. Ferns c. Coral d. Foraminifera
2. ..... react very slowly with cold water.
   a. K and Na b. Ca and Mg c. Zn and Fe d. Cu and Ag
3. ..... is an example of endangered living organisms.
   a. Mammoth b. Dodo c. Dinosaur d. Bald eagle
4. The snow crystal has ..... shape.
   a. octagonal b. hexagonal c. pentagonal d. quadrilateral

B Look at the opposite figure, then answer :

1. Mention the name of the apparatus.
2. Label the figure.
3. Calculate the volume of the gas that evolves at the positive pole if the volume of the gas at the negative pole is 20 cm^3



C What is the importance of the following ... ?

1. Liquefied nitrogen.
2. Nummulite fossil.
3. Silicon.
4. Aneroid.

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PART 3

19 Damietta Governorate — Official Language Schools

Answer the following questions :

Question 1

A Complete the following sentences :

1. Each period in the modern periodic table starts with ..... and ends with .....
2. There are ..... bonds between water molecules, while the bonds between atoms in water molecules are ..... bonds.
3. Archaeopteryx represents the link between ..... and .....
4. Ionosphere is surrounded by two magnetic belts known as ..... belts that play an important role in .....
5. Alkali metals are located in group ..... but halogens are located in group ..... in the modern periodic table.

B Mention the importance of each of the following :

1. Ozone layer.
2. Altimeter.
3. Liquefied nitrogen.

C Locate the position of the following elements in the modern periodic table : (With drawing)

1. $_{16}S$
2. $_{13}Al$
3. $_{10}Ne$

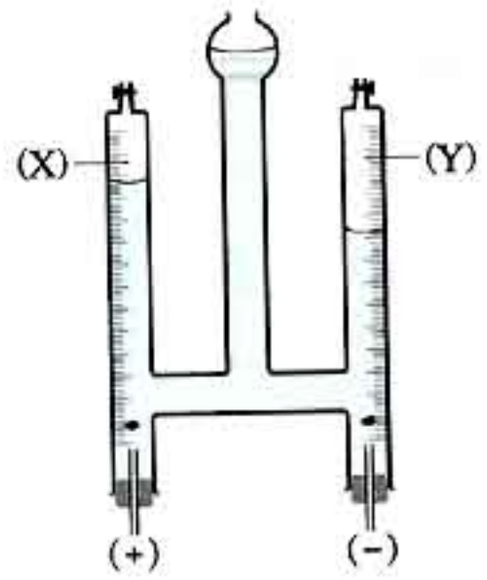
Question 2

A Write the scientific term for the following :

1. The ability of atom in covalent molecule to attract the bond electrons to it.
2. Continuous increase of the average temperature of the air near the surface of the Earth.
3. The death of all members of certain species of living organisms.
4. A type of ultraviolet radiations that is absorbed mostly (95%) in the ozone layer.
5. Safe places established to protect endangered species in their natural environment.
6. A block in the periodic table that contains groups from (3A) to (7A).

B From the opposite figure, answer the following :

1. What's the name of this apparatus ?
2. Letter (X) on the figure represents .....
3. Letter (Y) on the figure represents .....
4. Write the symbolic balanced chemical equation.



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C Calculate the temperature at the top of a mountain if its height is 4 km and the temperature at its foot is 30°C.

Question 3

A Choose the correct answer :

1. The scientist who discovered the main energy levels is .....
   a. Moseley. b. Bohr. c. Hofmann. d. Mendeleev.
2. ..... is considered the midway between horse and zebra.
   a. Quagga b. Bald eagle c. Panda bear d. Rhinoceros
3. The coldest atmospheric layer is .....
   a. troposphere. b. stratosphere. c. mesosphere. d. thermosphere.
4. Complete body fossils of insects are found preserved in .....
   a. ammonites. b. amber. c. igneous rocks. d. ambergris.
5. ..... react very slowly with cold water.
   a. K and Na b. Cu and Ag c. Zn and Fe d. Ca and Mg

B Write the symbolic balanced chemical equations which express the following reactions :

1. Dissolving of magnesium oxide in water.
2. Carbon dioxide with water.
3. Bromine with potassium iodide.

C Mention the harms of :

1. Storing water in plastic bottles.
2. Far ultraviolet rays on human.
3. Drinking water contains high concentration of mercury.

Question 4

A Give reasons for :

1. The lower part of stratosphere is suitable for flying aeroplanes.
2. Rhinoceros is from the endangered species.
3. Ionosphere layer is important for wireless communications.
4. Sodium fires do not put off with water.

B What is meant by ... ?

1. Dobson.
2. Chemical Activity Series.
3. Petrification.

C Correct the underlined words :

1. Infrared radiations has a **chemical** effect.
2. Panda bear is considered from **extinct** species.
3. Meteors burn in **thermosphere** layer.

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PART 3

20 Kafr El-Sheikh Governorate — Science Inspectorate

Answer the following questions :

Question 1

A Complete the following statements :

1. The hottest atmospheric layer is ..... and the coldest atmospheric layer is .....
2. Ultraviolet radiation has a ..... effect, and the infrared radiation has a ..... effect.
3. Archaeopteryx represents the link between ..... and .....
4. Mendeleev arranged the elements ascendingly according to ....., while Moseley arranged them ascendingly according to .....
5. $Br_2 + 2\ KI \longrightarrow$ ..... + ...

B Explain the behavior of these element with water :

1. Sodium.
2. Silver.

C Mention one example for :

1. Microfossils.
2. Extinct species.

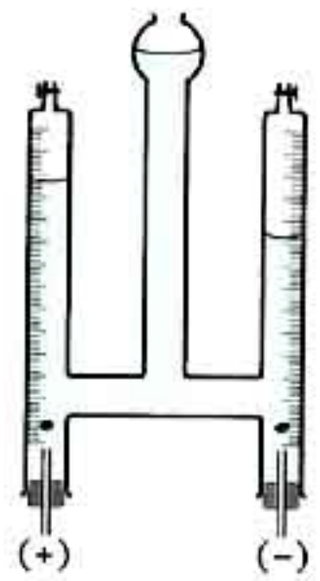
Question 2

A Choose the correct answer :

1. Complete fossils of mammoth are found preserved in .....
   a. ammonites. b. amber. c. snow.
2. The ..... is/are used in extinguishing fires.
   a. methyl bromide gas b. halons c. nitrogen oxide
3. All the following elements from metalloids except for .....
   a. silicon. b. bromine. c. boron.
4. The elements of group (1A) are known as .....
   a. alkali metals. b. halogens. c. alkaline Earth metals.
5. Metal oxides are ..... oxides.
   a. acidic b. basic c. amphoteric
6. All of the following are greenhouse gasses except .....
   a. CH_4 b. N_2O c. O_2
7. The scientist ..... discovered the main energy levels of the atom.
   a. Bohr b. Mendeleev c. Newton
8. The first established natural protectorate in Egypt is .....
   a. petrified forest. b. Wadi Hetan. c. Ras Mohamed.

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B Study the opposite figure , then answer the following questions :



1. Mention the name of this apparatus.
2. Write the chemical equation that shows the chemical reaction.
3. What is the volume of gas which burns with a pop sound when you approach a glowing splint to it if the volume of the other gas is 6 cm^3 ?

C Give reasons for :

1. Elements of the same group have similar properties.
2. Liquefied nitrogen is used in the preservation of the cornea of the eye
3. The lower part of stratosphere is suitable for flying aeroplanes.

Question 3

A Write the scientific term :

1. The descending arrangement of elements according to their chemical activity.
2. Traces and remains of living organisms that are preserved in sedimentary rocks.
3. Decrease in the thickness of the ozone layer.
4. The two magnetic belts that help in dispersing the harmful cosmic radiation.
5. The ability of the atom to attract the electrons of the chemical bond towards itself.
6. The radioactive element which is used in food preservation.

B Locate the position of the following elements in the modern periodic table :

1. ($_{19}K$) 2. ($_{9}F$) 3. ($_{5}B$) 4. ($_{10}Ne$)

C Compare between :

Simple ecosystem and complicated ecosystem.
(according to : Number of members - example)

Question 4

A Put (✓) or (✗) in front of each of the following :

1. The air moves vertically in the troposphere layer. ( )
2. Ice crystals have pentagonal shapes. ( )
3. In the period, as the atomic number increases the metallic property increases. ( )
4. The fossil record indicates the age of the sedimentary rocks. ( )
5. The ozone degree is measured by unit called Dobson. ( )

B Calculate the height of a mountain if the temperature at its base is (30°C) and the temperature at its top is (– 9°C).

C Write the symbolic balanced chemical equations which express the reaction of :

1. Carbon dioxide with water.
2. Magnesium with dil. hydrochloric acid.

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PART 3

21 El-Behira Governorate — Ismail Elhabrouk Formal Language School

Answer the following questions :

Question 1

A Complete the following statements :

1. The atomic size is measured by ..... , but the atmospheric pressure is measured by .....
2. Eating fish which contains high ratios of lead causes ..... , but drinking water which contains high ratios of mercury leads to .....
3. Ultraviolet radiation has a ..... effect, but the infrared radiation has a ..... effect.
4. From the examples of complete body fossils are ..... and .....

B What happens in each of the following cases ... ?

1. Decreasing water temperature to 2° C.
2. Increasing the ratio of nitrogen oxides in the atmosphere.
3. Silica matter replaces wood material part by part of an old tree.

C Calculate the height of mountain if the temperature at its bottom is (30°C) and at its top (– 9°C).

Question 2

A Write the scientific term for each of the following :

1. It is a series in which metals are arranged in a descending order according to their chemical activity.
2. A region separates between stratosphere and mesosphere where temperature is rather constant.
3. Fossils of the organisms that lived a short period of time in the past and become extinct.

B Mention one use or importance for each of the following :

1. Liquified nitrogen.
2. Altimeter.
3. Halons.

C From the opposite table which represents the properties of four elements, mention the symbol which represents an element from :

1. Alkali metal ..... , then indicates its group in periodic table.
2. Halogen ..... , then indicates its group in periodic table.
3. A metal ..... its oxide dissolves in water to from magnesium hydroxide.
(Show the balanced chemical equation)

Element symbol	Behaviour with water	Physical state	Density gm/cm^3
A	dissolve	gas	0.003
B	react	solid	3.59
C	react instantly	solid	0.86
D	react very slowly with cold water	solid	

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Question 3

A Choose the correct answer :

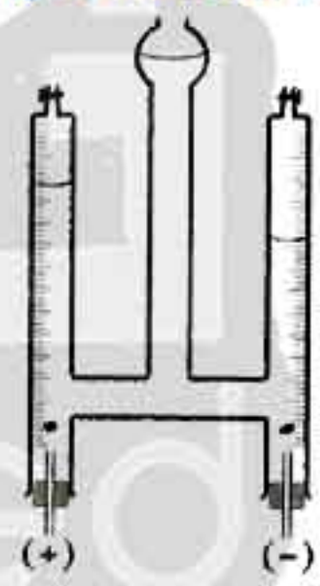
1. Degree of ozone under STP condition is ..... Dobson.
   a. 100 b. 200 c. 300 d. 400
2. Fossils are found in ..... rocks.
   a. metamorphic b. sedimentary c. igneous d. volcanic
3. Inert gases are located in the ..... block.
   a. s b. p c. d d. f
4. ..... protectorate is the first natural protectorate in Egypt.
   a. Saint Catherene b. Ras Mohamed c. Wadi Hetan d. Petrified forest

B Give reasons for :

1. Ionosphere is important for wireless comunications.
2. High boiling and freezing point of water.
3. Removing trees of tropical forests is one of the most important factors of extinction.

C From the opposite figure which illustrates Hofmann's voltameter used in electrolysis of water :

1. Write the chemical equation which illustrates the chemical reaction ?
2. What is the volume of gas which burns with a pop sound when you approach a glowing splint to it if the volume of the other gas is 5 cm^3 ?
3. Write the name of elements, which are collected at the cathode and anode.



Question 4

A Correct the underlined words in the following statements :

1. **Mammoth** represents a link between reptiles and birds.
2. Panda bear is considered from **extinct species**.
3. Meteors burn in **thermosphere** layer.
4. **Methane molecule** is considered as a polar molecule.

B Compare between :

1. Mendeleev's periodic table and Moseley's periodic table.
   (In terms of scientific principle of arranging elements)
2. Simple ecosystem and Complicated ecosystem.
   (In terms of : No. of members - example for each)

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PART 3

C Mention one example for :

1. A gas from greenhouse gases.
2. The most active metal.
3. An element doesn't react with water.
4. Type of fossils is considered as a guide for existence of petroleum well.

22 El-Minia Governorate — Minia Kawmia Language School

Answer the following questions :

Question 1

A Choose the correct answer :

1. ..... is the region between stratosphere and mesosphere.
   a. Thermopause b. Mesopause c. Stratopause d. Tropopause
2. Increasing the concentration of ..... in drinking water causes blindness.
   a. mercury b. lead c. arsenic d. chlorine
3. ..... is an example of microfossils.
   a. Mammoth b. Ferns c. Archaeopteryx d. Foraminifera
4. The scientist ..... had discovered the main energy levels.
   a. Moseley b. Bohr c. Hofmann d. Mendeleev
5. Ozone degree is measured in a unit called .....
   a. km. b. mm^2 c. nm. d. Dobson.

B Mention one use of each of the following :

1. Liquified nitrogen.
2. Hofmann's voltameter.
3. Methyl bromide gas.

C Mention one example of :

1. Endangered plant
2. Simple ecosystem.

Question 2

A Write the scientific term for each of the following sentences :

1. Fossils formed by the replacement of wood part by part keeping its shape without change.
2. The continuous increase in the average temperature of air near the surface of the Earth.
3. A bond that exists between water molecules.
4. The curved lines that join the points of equal pressure in atmospheric pressure maps.

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B Give reasons for :

1. Ionosphere is important for radio stations.
2. Elements of group (7 A) are known as halogens.
3. Ammonia (NH_3) is considered as a polar compound.
4. Formation of ozone layer in the stratosphere layer.

Question 3

A Choose from column (B) what suits in column (A) :

(A)	(B)
1. Corals	a. is a link between reptiles and birds.
2. Ferns	b. indicate the evolution from simple to complicated life.
3. Nummulites	c. are fossils that indicate that the environment, where they lived was a hot and rainy tropical.
4. Archaeopteryx	d. are fossils that indicate that the environment, where they lived was clear warm shallow seas.
	e. are fossils that indicate this area was a sea floor more than 35 million years ago.

B Write the balanced chemical equations that illustrate the following reactions :

1. Reaction of chlorine gas with potassium bromide solution.
2. Magnesium with dilute hydrochloric acid.
3. Carbon dioxide with water.

C Calculate the height of a mountain if the temperature at its base is (30°C) and at its top is (-9°C).

Question 4

A Correct the underlined words :

1. **Reproduction** is the continuous decrease without compensation in the number of a certain species of living organisms until all members of species die out.
2. Magnesium oxide is **an acidic oxide**.
3. Amber is an example of **mold** .
4. The atomic size **decreases** in the same group by increasing the atomic number.

B Compare between :

The groups and periods (Two points enough).

C What happens when ... ?

1. The pollution of water with animal and human wastes.
2. Overuse of freon.
3. Reaction of sodium with water.

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PART 3

23 Beni Suef Governorate — Official Language School Sector

Answer the following questions :

Question 1

A Complete the following statements :

1. Most of weather features occur in ..... layer, where satellites orbit in ..... layer.
2. Archaeopteryx is the link between ..... and .....
3. The scientist ..... had discover the main energy levels.
4. Sodium oxide is an example of ....., while sulphur oxide is an .....
5. Water has ..... effect on litmus paper.

B A mountain its height 6000 meter, the temperature on its foot is 30 C. Calculate the temperature at its top

C Compare between :

1. Simple ecosystem and complicated ecosystem (according to : number of members - examples).
2. Elements of group 1 A and elements of group 7 A (according to : name - valency).

Question 2

A Write the scientific term :

1. Fossils exist in the rocks of different areas that indicates the extinction and evoluation of organisms.
2. A type of ultraviolet radiation that is absorbed completely by ozone layer.
3. A water pollutant that causes death of brain cells.
4. A metalloid is used in the manufacturing of electronic devices.
5. The ability of atom in a covalent molecule to attract electrons towards itself .
6. The death of all members of species of living organisms.

B Explain the behaviour of the following elements with water :

1. Iron. 2. Silver. 3. Potassium. 4. Magnesium.

C What is the importance of ... ?

1. Altimeter. 2. Index fossils. 3. Cobalt 60. 4. Liquid sodium.

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Question 3

A Give reasons for :

1. Establishing the natural protectorates .
2. Water is a polar compound.
3. The high boiling point of water.
4. Stopping manufacturing of ultrasound concorde aeroplanes .
5. Mesosphere layer is highly rarefied layer.
6. Scientist thought about classification of elements.

B Write the symbolic chemical equation that indicates the following reactions :

1. Reaction of chlorine gas with potassium bromide.
2. Magnesium with dilute hydrochloric acid.
3. Carbon dioxide with water.

C Mention one example for :

1. Endangered bird.
2. Petrified fossils.
3. Bright phenomenon at the Earth poles.
4. Most metallic element in group 1A.

Question 4

A Put true or false in front of the following statements :

1. Methyl bromide used in extinguishing fires. ( )
2. Infrared radiation has a chemical effect. ( )
3. Ionosphere is the lowest layer in temperature. ( )
4. Ozone hole increases in January each year. ( )
5. Water density increases by freezing. ( )
6. Mendeleev arranged elements according to their atomic number. ( )
7. Its preferable to store tap water in empty plastic bottles. ( )

B Locate the position of the following elements in the periodic table :

1. $^{1}H_{1}$
2. $_{2}Ne^{4}$
3. $_{20}Ca^{40}$
4. $_{7}N^{14}$
5. $_{3}Li^{7}$

C Calculate the volume of gas which burns with a pop sound on approaching a glowing splint to it in the cathode of the Hofmann's voltammeter, if the volume of other gas is 6 cm^3

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PART 3

24 Luxor Governorate — Science Inspectorate

Answer the following questions :

Question 1

A Complete the following statements :

1. From the extinct species in the recent times are ..... and .....
2. Mendeleev arranged the elements ascendingly according to ....., while Moseley arranged them ascendingly according to .....
3. ..... and ..... are examples of polar compounds
4. Chlorine can replace ..... and ..... in their salt solutions.
5. ..... is an instrument used by pilots in aeroplanes to measure their elevation above sea level.

B Give reasons for :

1. Ionosphere is important for radio stations.
2. Naming the petrified forest in Qattamiya with wood mountain.

Question 2

A Choose the correct answer :

1. The largest atom of elements in size is ..... atom.
   a. cesium (Cs) b. fluorine (F) c. bromine (B)
2. The gas evolved on reacting alkali metals with water is .....
   a. oxygen. b. hydrogen. c. nitrogen.
3. Elements of p-block are arranged in ..... groups.
   a. 2 b. 6 c. 10
4. Luminous meteors are formed in ..... layer.
   a. ionosphere b. stratosphere c. mesosphere
5. Complete body fossils of insects are found preserved in .....
   a. ammonites. b. amber. c. igneous rocks.
6. ..... is the region between stratosphere and mesosphere.
   a. Stratopause b. Mesopause c. Tropopause

B Write the scientific term of each of the following :

1. Elements, which have the properties of metals and nonmetals.
2. The death of all members of a species of a living organisms.
3. The radioactive element, which is used in the food preservation.
4. Fossils of organisms that had lived for a short period of time in the past and had a wide geographic distribution, then become extinct.

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C What is meant by ... ?

1. Atmospheric pressure.
2. Chemical Activity Series.

Question 3

A Put (✓) or (✗) with correcting the false ones :

1. The first real table for classifying elements is the modern periodic table. ( )
2. Each period starts with a strong metal. ( )
3. Wind moves from regions of low atmospheric pressure to that of high atmospheric pressure. ( )
4. Archaeopteryx is a link between reptiles and birds. ( )
5. A hydrogen bond is weaker than a covalent bond. ( )

B What happens when ... ?

1. Storing water in plastic bottles.
2. Oxygen atom combines with oxygen molecule.
3. An organism is buried fast after death in snow.

C Choose the odd word out :

1. Fluorine - Iodine - Chlorine - Argon.
2. CO_2 - MgO - Na_2O - CaO.
3. Rhinoceros - Panda bear - Mammoth - Bald eagle.

Question 4

A Mention an example of each of the following :

1. A fossil of solid mold.
2. Petrified fossils.
3. A natural protectorate.
4. Greenhouse gases.

B Problem Find temperature at the top of a mountain if it's height is 4 km and the temperature at its foot is 24°C.

C Locate the position of the following elements in the modern periodic table :

1. $_{11}Na$
2. $_{1}H$
3. $_{10}Ne$

25 New Valley Governorate — El-Dakhlah Educational Zone

Answer the following questions :

Question 1

A Complete the following statements :

1. Mendeleev arranged the elements ascendingly according to ....., while Moseley arranged them ascendingly according to .....
2. Ozone layer is formed in ..... layer, while meteors is formed in ..... layer.

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PART 3

3. There is ..... bond among the atoms that form water molecule, while there is ..... bond among water molecules.
4. ..... is from extinct birds, while ..... is from endangered birds.
5. $Br_2 + 2\ KCl \longrightarrow$ .....

B Mention two conditions of fossils preservation (formation) ?

C If the temperature at a mountain foot is 35° C. Calculate the temperature at its top if its height is 3 km.

Question 2

A Choose the correct answer :

1. The scientist ..... had discovered the main energy levels
   a. Moseley b. Rutherford c. Bohr
2. The complete body fossils are found in .....
   a. silica. b. sedimentary rocks. c. snow.
3. ..... gas evolved when sodium reacts with water.
   a. O_2 b. N_2 c. H_2
4. ..... is from extinct mammals.
   a. Dodo b. Rhinoceros c. Quagga
5. Increasing the concentration of ..... in water causes the death of brain cells.
   a. mercury b. lead c. arsenic

B Mention one use (importance) for each of the following :

1. Van-Allen belts.
2. Isobar.
3. Altimeter in aeroplanes.

C Locate the position of the following elements in the modern periodic table :

1. $_{18}Ar$ 2. $_{11}Na$

D What are the results based on ... ?

1. Mixing human and animals wastes with water.
2. Increasing the concentration of greenhouse gases in air.

E What is the difference between mold and cast ?

Question 3

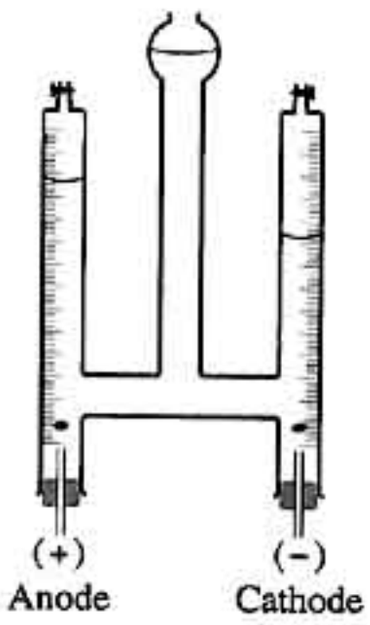
A Write the scientific term :

1. Elements, which have the properties of metals and nonmetals.
2. Remains of old organisms that lived in the past for a short period, then became extinct.
3. A charged layer reflects radio waves.
4. Natural safe areas that are established to protect the endangered species.
5. A descending arrangement of elements according to their chemical activity.

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B The opposite figure represents Hofmann's voltameter, which is used in the water electrolysis :

1. Write the chemical equation, which expresses the reaction.
2. If the volume of the gas, which burns with a pop sound = 20 cm^3. What is the volume of the other gas?
3. What is the name of the gas, which collected at each of the following ?
   a. Anode. b. Cathode.



C Exclude the unsuitable word and mention what the rest has in common :

1. Li / Na / Cl / K
2. Cl_2 / O_2 / I_2 / Br_2

D Compare in a table between simple ecosystem and complicated ecosystem.

Question 4

A Give reasons for :

1. Using liquefied nitrogen in the preservation of the eye cornea.
2. Stopping manufacturing of concorde aeroplanes.
3. Water and ammonia are from polar compound.
4. We should not keep the tap water in plastic bottles.

B Mention the measuring unit of each of the following :

1. The wavelength of the ultraviolet radiation.
2. Atmospheric pressure. 3. The degree of ozone.

C Illustrate with formula and equation only, the role of ultraviolet radiation in the formation of ozone gas.

D Choose from column (B) what suits in column (A) :

(A)	(B)
1. Atomic size	a. decreases by increasing the height (elevation).
2. Non-metallic property	b. increases as we go done in group 1 A.
3. Atmospheric pressure	c. decreases by decreasing the temperature.
4. Metallic property	d. decreases as we go to right side in period.
5. Water density	e. decreases as we go done in group 7 A.

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PART 3

26 South Sinai Governorate — Tur Sinai Directorate

Answer the following questions :

Question 1

A Write the scientific term :

1. Continuous decrease in numbers of species members without compensation until all die out.
2. The descending arrangement of elements according to their chemical activities.
3. The erosion of ozone layer above the south pole.
4. The traces and remains of the old living organisms, which are preserved in the sedimentary rocks.
5. The ability of the atom in the covalent molecule to attract the chemical bond electrons to it.

B Locate the position of the following elements in the modern periodic table :

1. $_{18}Ar$
2. $_{20}Ca$

C Write one example of the following :

1. Fossil of a complete body.
2. Polar compound.
3. Animal extinct in old time.
4. Mold fossil.
5. A simple ecosystem.

Question 2

A Choose the odd word out, then link between the rest words :

1. Dodo bird - Ibis bird - Bald eagle - Panda.
2. Halons - Methyl bromide - Chlorofluorocarbon compounds - Carbon dioxide.
3. $_{3}Li$ - $_{11}Na$ - $_{19}K$ - $_{12}Mg$
4. Studing life evolution - Petrified forests - Petroleum exploration - Age determination of rocks.
5. $_{6}C$ - $_{9}F$ - $_{17}Cl$ - $_{35}Br$

B Give reasons for :

1. The formation of aurora phenomenon.
2. The atomic size of the same group increases by increasing their atomic number.

C If the temperature at the base of mountain = 13°C, How much is the temperature at its top if the mountain height is 2 km ?

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Question 3

A Correct the underlined :

1. The first mammoth fossil was discovered preserved in **an amber**.
2. Sodium is kept under the **water** surface.
3. Group **7 A** called alkali metals.
4. **Wadi El-Raiyan** protectorate is the first established protectorate in South Sinai.
5. **Foraminifera** fossil links between reptiles and birds.
6. Meteors are formed in **troposphere** due to friction with air molecules.
7. **Iodine** is from liquid halogens.
8. Transition elements are found **below** the modern periodic table.

B Match to (A) what is suitable from (B) :

(A)	(B)
1. Liquefied nitrogen	a. used in the food preservation.
2. Cobalt 60	b. used to determine today's weather.
3. Altimeter	c. used to measure the altitude of planes.
4. Aneroid	d. used determine the age of rocks.
	e. used in the preservation of the cornea.

C If the volume of gas produced from the electrolysis of water at cathode = 8 cm^3, Calculate the volume of gas produced at anode and write its name.

Question 4

A Choose the correct answer :

1. The pure water boils at ..... °C.
   a. 200 b. 40 c. 100 d. 70
2. The modern periodic table consists of ..... periods.
   a. 7 b. 18 c. 17 d. 71
3. Each period in the modern periodic table starts with ..... element.
   a. nonmetalic b. noble gas c. semi-metallic d. metal
4. The ..... fossil indicate that the environment where they lived was clear, warm, and shallow seas.
   a. ferns b. nummulites c. fish d. coral
5. Normal atmospheric pressure = ... millibar.
   a. 1013.25 b. 76 c. 1.013 d. 760

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PART 3

6. The crystals of ice take ..... shape.

a. quintet b. quadrilateral c. octogenarian d. hexagonal

7. The solution produced from dissolving the non-metal oxides in water turns the violet litmus solution into .....

a. red. b. blue. c. not changed. d. green.

8. Sodium react with water and ..... gas produced.

a. H_2 b. CO_2 c. N_2 d. O_2

B Compare between the air movement in troposphere and the lower part of stratosphere.

C What happens when ... ?

1. Water polluted with human and animal wastes.
2. Oxygen molecule absorbed ultraviolet rays.
3. Increasing the ratio of carbon dioxide gas in air.
4. Added dilute hydrochloric acid to magnesium ribbon.

RaNia SaYed

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2
PART

30 Final Exams of some Schools Governorates

2019



* Some exams questions have been modified according to the ministry modifications for the first term 2017 - 2018

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Part 3

1 Cairo Governorate

Heliopolis Educational Zone
Saint Clare's College

Answer the following questions :

Question 1

A Complete the following statements :

1. Elements in group (1A) are called alkali metals as their elements react with ..... forming ..... solutions.
2. The highest temperature layer in the atmosphere is ..... and the lowest temperature one is .....
3. From the examples of complete body fossils are ..... and .....
4. By increasing the atomic number, the value of metallic property ..... in the groups of the periodic table.
5. Elements of group (B) are called ..... elements and they appear from period .....
6. Fluorine and chlorine exist in ..... state, while iodine exists in ..... state.
7. There are ..... bonds between water molecules.

B Find the temperature at a point of height 2000 metres above sea level if the temperature at sea level is 23°C.

C Give reasons for :

1. The atomic size decreases in periods by increasing the atomic number.
2. Liquefied nitrogen is used in preservation of cornea of the eye.
3. Don't store tap water in empty plastic bottles of mineral water.
4. Pilots prefer to fly their planes at the lower part of stratosphere layer.

Question 2

A Write the scientific term :

1. Continuous decrease in the number of living organisms without compensation until all die out.
2. A liquid metal acts as a heat conductor in nuclear reactors for generating electricity.
3. The traces and remains of old living organisms which are preserved in the sedimentary rocks.
4. The ability of the atom in a covalent molecule to attract electrons of the chemical bond towards itself.
5. The kind of bond which binds oxygen atom with hydrogen atom in water molecule.
6. The weight of air column of an atmospheric height on a unit area.
7. A phenomenon that occurs due to the increase in the percentage of CO_2 gas and leads to an increase in the planet Earth's temperature.

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B What happens if ... ?

1. Dissolving magnesium oxide in water (write the equation).
2. Passing chlorine gas in potassium bromide solution.
3. Drinking water polluted with mercury.

C Locate the position of the following elements in the modern periodic table :

1. $^{20}_{10}Ne$ 2. $^{40}_{20}Ca$ 3. $^{32}_{16}S$ 4. $^{4}_{2}He$

Question 3

A Choose the correct answer :

1. Meteors are formed in .....
   a. mesosphere. b. ionosphere. c. exosphere. d. stratosphere.
2. All these are greenhouse gases except .....
   a. CO_2 b. O_2 c. N_2O d. CH_4
3. From the endangered species is .....
   a. dinosaur. b. bald eagle. c. dodo bird. d. quagga.
4. All of the following metals react with water except .....
   a. K b. Cu c. Na d. Mg
5. Ozone degree is measured in a unit called .....
   a. millibar. b. nanometre. c. dobson. d. picometre.

B Correct the underlined words :

1. **Chlorine** element has the smallest atomic size.
2. **Chemical** pollution of water causes many diseases as typhoid and hepatitis.
3. The **thermometer** is an instrument used to measure the atmospheric pressure.
4. **Rutherford** discovered the main energy levels.
5. **Oil** is a covalent compound dissolves in water.
6. **Amphibian** fossil is a link between reptiles and birds.

C Mention one use for each of the following elements :

1. Altimeter. 2. Cobalt 60 3. Van-Allen belts.

Question 4

A Put (✓) or (✗) and correct the wrong ones :

1. Mammoth and dinosaur are old extincted animals. ( )
2. Halogens are monovalent elements. ( )
3. Solutions of metal oxides turn blue litmus papers into red. ( )
4. Mendeleev arranged the elements in an ascending order according to their atomic numbers. ( )

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Part 3

5. Infrared radiations have chemical effect. ( )
6. The atomic size increases in the group by increasing the atomic number. ( )
7. Tropical forest is considered as simple ecosystem. ( )

B What is meant by ... ?

1. Polar compounds. 2. Aurora phenomenon. 3. Chemical activity series.

C Mention two ways to protect living organisms from extinction.

2 Cairo Governorate

Nozha Directorate of Education
Nozha Language Schools

Answer the following questions :

Question 1

A Complete the following statements :

1. Elements that locate in the middle of the periodic table are called ..... and they start to appear from the period number .....
2. Mendeleev arranged the elements ascendingly according to ..... , while Moseley arranged them ascendingly according to .....
3. From the negative effects of global warming are ..... and .....
4. Ozone layer is found in ..... layer, while meteors are burnt in ..... layer.

B Give reasons for :

1. Water and ammonia are from polar compounds.
2. Water density decreases on freezing.
3. Cobalt 60 is used in food preservation.
4. Chlorine replaces bromine in potassium bromide solution.

C If the temperature at the sea level is 26°C, find the temperature at the top of a mountain its height is 4 km.

Question 2

A Choose the correct answer :

1. The volume of oxygen evolved during electrolysis of water is ..... the volume of hydrogen.
   a. equals b. half c. twice d. four times
2. Bilharzia is from the harms resulted from ..... water pollution.
   a. chemical b. thermal c. biological d. radiant
3. ..... fossils indicate the environment where they lived was tropical, hot and rainy.
   a. Ferns b. Nummulites c. Coral d. Dinosaurs

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4. Three elements in the same period (A : non-metal , B: metal, C: metalloid), which of the following represents their correct arrangement in the period from left to right ? .....

a. | B | C | A | b. | A | B | C | c. | B | A | C | d. | C | A | B |

B Compare between :

1. Simple ecosystem and complicated ecosystem. (According to definition - example).
2. Reasons of old extinction and recent extinction (2 points for each one).
3. Halogens and alkali metals (2 points for each one).

C Mention the name representing :

1. A greenhouse gas.
2. A solid halogen.
3. A mold fossil.
4. An endangered plant.

Question 3

A Put (✓) or (✗) and correct the wrong ones :

1. "p" block elements consists of 10 groups. ( )
2. Halons are produced from supersonic planes. ( )
3. Increasing the concentration of mercury in water causes blindness. ( )
4. Some alkalis dissolve in water forming bases. ( )
5. Amber is a complete body fossil. ( )
6. Wadi El-Hetan protectorate is the first established protectorate in Egypt. ( )

B Mention one importance for :

1. Van-Allen belts.
2. Liquefied nitrogen.
3. Altimeter.
4. Fossils.

C In front of you two elements from the periodic table :

($_{12}Mg$ / $_{17}Cl$)

a. Locate them in the periodic table and mention their block.

b. Which one has the smallest size ? Why ?

Question 4

A Write the scientific term :

1. Descending arrangement of metals according to their chemical activity.
2. Traces and remains of old living organisms preserved in sedimentary rocks.
3. Coloured bright curtains seen at the two poles.
4. Weight of air column of an atmospheric height on a unit area ($1m^2$).
5. A layer which plays an important role in wireless communications.

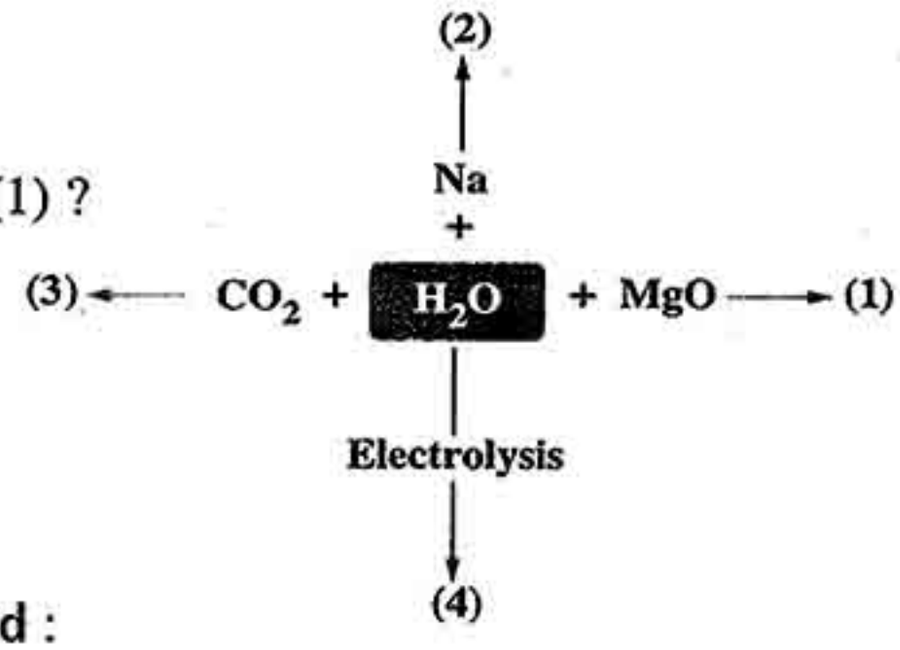
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Part 3

B **In the opposite figure :**

1. Write the products of reactions (1) , (2) , (3).
2. What is the type of solution resulted in reaction (1) ?
3. What is the effect of the product of reaction (3) on the litmus paper ? Why ?
4. In reaction (4), hydrogen gas evolves at ..... , while oxygen gas evolves at .....



C **Mention the name of the scientist who discovered :**

1. Normal degree of ozone.
2. Protons inside nucleus.
3. Added zero group to the periodic table.
4. Main energy levels.

3 Cairo Governorate — Nasr City Educational Directorate

Answer the following questions :

Question 1

A **Complete the following statements :**

1. Elements of group (1A) are called ....., but elements of group (7A) are called .....
2. The hottest atmospheric layer is ....., but the coldest atmospheric layer in the atmospheric envelope is .....
3. The transition elements start to appear from the beginning of the ..... period and symbolized by letter .....
4. The bond between hydrogen atom and oxygen atom in water molecule is ..... bond, while bonds among water molecules are ..... bonds.
5. Archaeopteryx represents a link between ..... and .....
6. When the temperature of water becomes less than 4°C, its volume ....., while its density .....
7. ..... are used in extinguishing fires and ..... is used as coolant in cooling devices.
8. In the upper part of stratosphere, ... layer is found which absorbs ..... rays emitted from the Sun.

B **Mention an example for each of the following :**

1. Halogen exists in a solid state.
2. The strongest metallic element.
3. Covalent compound cannot dissolve in water.
4. Trace fossil.

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C The figure shows a section of the modern periodic table :

X		
$_{11}$L	Z	
M		
O		

1. What is the atomic number of the element (Z).
2. What is the atomic number of the element (X).
3. Element ($_{11}$L) is located in period ..... and group .....

Question 2

A Choose the correct answer :

1. Eating fish, which contain high concentration of ..... causes the death of brain cells.
   a. mercury b. arsenic c. lead d. iron
2. The electronic configuration of calcium ion (Ca^{++}) is similar to .....
   a. $_{18}$Ar b. $_{7}$N c. $_{10}$Ne d. $_{2}$He
3. When mud fills up the shell cavities and solidify, then shell decomposes, ... is produced.
   a. a petrified wood b. a solid mold c. a cast d. no correct answer
4. The atmospheric envelope is inserted in the outer space in a region known as .....
   a. exosphere. b. ionosphere. c. stratopause. d. mesopause.
5. Ionosphere layer is surrounded by two ..... belts.
   a. ionic b. electric c. heat d. magnetic

B What happens when ... ?

1. Storing water in plastic bottles of mineral water.
2. Meteors move at a very high velocity in mesosphere layer.
3. An atom of a nonmetallic element gains one electron or more during the chemical reaction.
4. The melting rate of polar ice increased.
5. Silica matter replaces wood material part by part of an old tree.

C Compare between : Basic oxides and acidic oxides.

D Choose from column (B) what suits it in column (A) :

(A)	(B)
1. Liquid sodium	a. is used in preservation of food.
2. Liquefied nitrogen	b. is used in manufacture of electronic devices.
3. Cobalt 60	c. is used in nuclear reactors.
4. Silicon slides	d. is used in preservation of cornea of the eye.

Question 3

A Complete the following chemical equations :

1. $2NaBr + Cl_2 \longrightarrow$ ..... + ...
2. $Mg + 2HCl \xrightarrow{dil.}$ ..... + ...
3. ..... + ... $\longrightarrow 2KBr$

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Part 3

B Give reason for each of the following :

1. Dodo bird was an easy target for hunters.
2. Pilots prefer to fly their planes in stratosphere.
3. Although water of oceans freezes at polar zones, the aquatic creatures are still alive.
4. Mammoth fossil is preserved as a complete body fossil.

C Calculate the temperature at the base of a mountain, if its height is 6 km and the temperature at its top is 10°C.

D Choose the odd word out, then write the scientific term of others :

1. Sodium / Silver / Potassium / Calcium.
2. N_2 / N_2O / CO_2 / CH_4
3. Panda bear / Bald eagle / Dinosaur / Barbary sheep.
4. Hofmann's voltameter / Altimeter / Barometer / Aneroid.
5. Trilobite fossil / Ammonites fossil / Nummulites fossil / Ferns fossil

Question 4

A Correct the underlined words :

1. Petrified wood is considered as **rocks**.
2. Each period in the periodic table starts with **inert gas**.
3. An element which is located in the 3rd period and group (2A), its atomic number is **8**
4. Mixing animals and human wastes with water causes **chemical** pollution.

B Write the scientific term :

1. Safe places that are specified to protect the endangered species in their homeland.
2. A phenomenon that appears as brightly coloured light curtains seen at both poles of the Earth.
3. The continuous increase in the average temperature of the air near the surface of the Earth.
4. The ability of the atom in a covalent molecule to attract the electrons of the chemical bond towards itself.
5. The solidified resinous matter, which was secreted by pine trees during old geologic ages.
6. The block that contains the series of lanthanides and actinides.

C Mention one importance for :

1. Altimeter.
2. Methyl bromide gas.

D What do the following numbers indicate ... ?

1. 300 dobson.
2. 104.5°

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4 Cairo Governorate

El-Waily Educational Zone
St. Joseph Maronite Language Schools

Answer the following questions :

Question 1

A Write the scientific term :

1. An atmospheric layer at which the air moves vertically.
2. The ability of the atom in the covalent molecule to attract the chemical bond electron to it.
3. A phenomenon looks like colourful light curtains seen in the two poles.
4. The traces and remains of old living organisms which are preserved in sedimentary rocks.

B Write one use for each of the following :

1. Liquefied nitrogen.
2. Sodium in liquid state.

C Locate the position of the following elements in the modern periodic table :

1. $_{19}K$
2. $_{10}Ne$

Question 2

A Complete the following statements :

1. The atmospheric pressure at sea level equals ..... mb.
2. The ultraviolet rays are three kinds which are ..... , ... and .....
3. Sodium is kept under the surface of ..... so, as not to react with .....

B Write one difference between :

1. Metals and nonmetals.
2. Mesosphere layer and thermosphere layer.
3. Coral fossils and ferns fossils.

C Write the equation of electrolysis of water.

Question 3

A Give reasons for :

1. Cesium is considered from the strongest metallic element.
2. The ozone layer acts as a protective shield for living organisms.
3. Amber is considered as suitable medium to form a complete body fossil.

B What happens when ... ?

1. Putting a magnesium strip in a test tube containing oxygen.
2. Decrease in water temperature less than 4°C.

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Part 3

C Mention an example for :

1. Tracc. 2. Cast. 3. Petrified fossil. 4. Endangered bird.

Question 4

A Put (✓) or (✗) and correct the wrong ones :

1. The troposphere is the first layer in the atmospheric envelope. ( )
2. The millibar is the unit of measuring the ozone degree. ( )
3. The decrease of plants on the Earth leads to the increase in the temperature. ( )
4. The dinosaur is the most famous extinct species recently. ( )

B Define each of the following :

1. Chemical activity series.
2. Greenhouse phenomenon.

C Find the temperature at a point of height 2000 metres above sea level, if the temperature at sea level is 23°C.

5 Cairo Governorate

Rod-El Farag Directorate
Saint Mary's School

Answer the following questions :

Question 1

A Complete the following statements :

1. ..... and ..... are metals which don't react with water.
2. Archaeopteryx represents the link between ..... and .....
3. Mendeleev arranged the elements in an ascending order according to ..... , while Moseley arranged them in an ascending order according to .....
4. Troposphere layer contains about ..... of the mass of the atmospheric air and about ..... of atmospheric water vapour.
5. Elements of s-block are located on the ..... of the periodic table and they are arranged in ..... groups.
6. The polarity of water is ..... than that of ammonia as the difference in ..... between elements of water is ..... than that between elements of ammonia.
7. ..... is used in food preservation.
8. The thickness of stratosphere is ..... , while that of mesosphere is .....

B Find the location of the following elements in the periodic table :

1. $_{11}Na$ 2. $_{18}Ar$

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C What happens when ... ?

1. Dissolving magnesium oxide in water then adding drops of litmus solution to it.
2. Dipping the old insects in amber.
3. Infrared radiations don't reemit back from troposphere layer.
4. There is no difference in electronegativity between hydrogen atom and oxygen atom in water molecule.

Question 2

A Write the scientific term of each of the following :

1. The strongest metal in group (1A).
2. They are symbolized by the letters s , p , d and f
3. A type of ultraviolet radiation that is absorbed completely (100 %) by the ozone layer.
4. Fossils of living organisms lived for a short time in the past in a wide geographical range then became extinct.
5. A unit that measures the degree of ozone.
6. It is a path of energy that transfers from a living organism to another.
7. The elements that occupy the middle block (d) in the periodic table.
8. The halogen that exists in a liquid state.

B Mention one example for :

1. Extinct bird in recent time.
2. Greenhouse gases.

C Mention one importance for :

1. Liquefied nitrogen.
2. Van-Allen belts.

D Calculate the height of a mountain if the temperature at the foot of the mountain is 30°C and at the top of this mountain is 10.5°C.

Question 3

A Choose the correct answer :

1. The scientist ..... had discovered the main energy levels.
   a. Moseley b. Hofmann c. Bohr d. Mendeleev
2. The ..... replaces the wood material, part by part of an old tree.
   a. plastic b. iron c. silica d. copper
3. ..... is an example of microfossils.
   a. Mammoth b. Fern c. Foraminifera d. Coral
4. Mammoth fossil is an example of a ..... fossil.
   a. cast b. mold c. complete body d. petrified
5. All of the following elements are metalloids except .....
   a. tellurium. b. silicon. c. boron. d. bromine.

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Part 3

6. The air in troposphere layer moves .....

a. horizontally. b. vertically. c. inclined. d. no right answer.

7. Which of the following elements is located in the third period ? .....

a. $_{19}K$ b. $_{6}C$ c. $_{3}Li$ d. $_{15}P$

8. Alkali metals have the following properties except they .....

a. have low density. b. conduct electricity.

c. don't react with water. d. conduct heat.

B On electrolysis of acidified water by Hofmann's voltameter :

1. What is the name of the gas that evolves at the anode ?
2. Calculate the volume of the gas formed at the cathode, if the volume of the gas that evolves at the anode is 15 cm^3.

C What is meant by ... ?

1. Extinction.
2. Aurora phenomenon.
3. Ozone hole.
4. Simple ecosystem.

Question 4

A Correct the underlined words :

1. **Nummulites** fossils are used to determine the age of the sedimentary rocks.
2. Eating food containing high percentage of lead causes **blindness**.
3. Moseley put lanthanides and actinides elements **on the left side of** the periodic table.
4. The number of electrons in positive ion is **equal to** that of its atom.
5. Storing the tap water in plastic bottles cause the increase of infection of **hepatitis**.

B Give reasons for :

1. Most of weather conditions take place in the troposphere layer.
2. Atomic size of sodium ($_{11}Na$) is greater than that of magnesium ($_{12}Mg$).
3. Adding drops of dilute acid to water during its electrolysis.
4. Pure water doesn't affect blue and red litmus papers.

C Compare between : Cast and mold.

D Write the balanced chemical equation of the following reactions :

1. Burning a piece of coal in air.
2. Sodium bromide with chlorine.
3. Potassium with bromine.

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6 **Cairo Governorate** Basateen & Dar El-Salam Educational Administration

Answer the following questions :

Question 1

A Choose the correct answer :

1. Bilharzia is due to the ..... pollution of water.
   a. biological b. thermal c. chemical
2. The atomic radius is measured in .....
   a. nanometre. b. picometre. c. kilometre.
3. A fossil that plays an important role in petroleum exploration is .....
   a. morgan. b. nummulites. c. foraminifera.
4. The difference in electronegativity between the two elements of a polar compound is .....
   a. zero. b. relatively high. c. small.
5. Ice crystals have ..... shape.
   a. tetragonal b. pentagonal c. hexagonal

B If the temperature at the base of a mountain is 20.6°C, calculate the temperature at its top if the mountain's height is 8862 m.

C Use the figures below to write the correct letter in the space provided :


(a) Archaeopteryx


(b) Insect in amber


(c) Petrified wood


(d) Foraminifera


(e) Ammonites

Main characteristics of fossils	Letter
1. An example of complete body preserved from decaying and form fossil.	
2. A rock mold carrying the internal details of the snail.	
3. Minerals replace the organic matter of organism, part by part, without changing its shape.	
4. Used to study life evolution as it represents the link between reptiles and birds.	
5. A good indication of the age of rocks and suitable conditions of petroleum formation.	

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Part 3

Question 2

A Write the scientific term of each of the following :

1. A table in which the elements are arranged according to their atomic weights.
2. An area where the atmospheric envelope is inserted in outer space.
3. Elements where their valency shell contains more than four electrons.
4. A molecule produced from the union of an oxygen atom and its molecule.
5. A safe place used to protect endangered species from extinction.
6. They indicate the age of sedimentary rocks in which they are found.

B Study the opposite figures and answer the following questions :

1. Which figure represents a positive ion ?
2. Which figure represents a neutral atom ?
3. Determine the position of the atom in the periodic table.

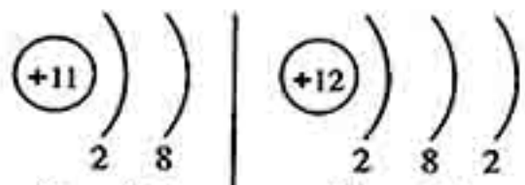


fig. (a) fig. (b)

C What is the difference between ?

1. Simple and complex ecosystems.
2. The importance of nummulites and ferns fossils.

Question 3

A Correct the underlined words :

1. Dissolving basic oxides in water produces **acids**.
2. Zero group contains **active** gases.
3. The layer that represents (75%) of the atmospheric air mass is **mesosphere** .
4. Atmospheric pressure is measured by a unit called **dobson** .
5. Radio waves are reflected and transmitted by communication centres in **stratosphere** .
6. From the most important greenhouse gases is **ammonia** .

B Give reasons for :

1. Water has high boiling point.
2. Bromine cannot replace chlorine in sodium chloride.
3. Ozone layer acts as a protective shield for living organisms.
4. Global warming phenomenon has negative effects on Earth.

Question 4

A The opposite figure shows the reaction of sodium and water :

1. Write the balanced chemical equation of the reaction.
2. Name the gas produced and how you can test about it.



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B Mention the importance of :

1. Liquid sodium.
2. Ras Mohamed protectorate.
3. Altimeter.
4. Coral fossils.

C Write a balanced symbolic chemical equation for the following reactions :

1. Carbon dioxide with water.
2. Potassium iodide with bromine.
3. Magnesium with dilute hydrochloric acid.

7 Giza Governorate

Boulak El-Dakrour Directorate
Dar El-Hanan Language School

Answer the following questions :

Question 1

A Complete the following statements :

1. Moseley put ..... and ..... series below the periodic table.
2. Each period in the modern periodic table starts with ..... and ends with .....
3. The valency of alkali metal elements is .....
4. ..... and ..... are endangered mammals.
5. Fossils are used in ..... exploration and determination the age of .....
6. Fossils always exist in the .....

B Mention the use of :

1. Liquid sodium.
2. Cobalt 60.

Question 2

A Write the scientific term :

1. A bond that exists between water molecules.
2. Indicated by the letters K, L, M, N, O.
3. A device used to measure the elevations above sea level.
4. Two magnetic belts help in scattering the harmful cosmic radiations away from the Earth.
5. Safe areas established to protect the endangered species in their homeland.

B Give reasons for :

1. Elements of the same group have the same properties.
2. Liquefied nitrogen is used in preservation of cornea of eye.
3. The lower part of stratosphere is suitable for flying planes.
4. The simple ecosystem is significantly affected by the absence of one of its species.

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الصف الثانى الاعدادى موقع ذاكرولى التعليمى كتاب المعاصر

Part 3

Question 3

A Correct the underlined words :

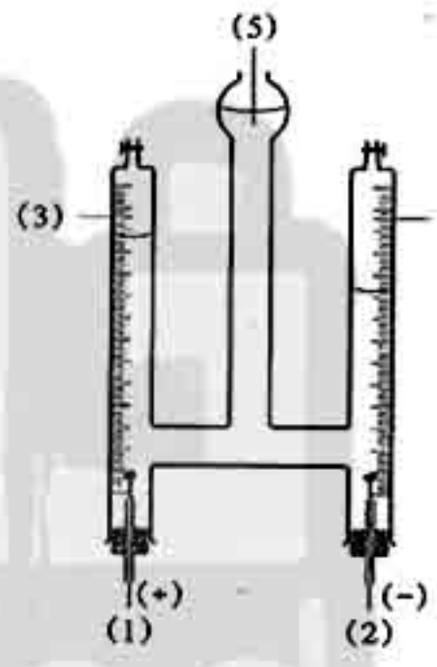
1. The elements with the same physical and chemical properties have been put in **horizontal periods**.
2. All weather phenomena like rains, wind and clouds occur in the **ionosphere**.
3. **Millibar** is the unit of measuring the ozone degree.
4. **Archaeopteryx** fossil is a kind of extinct elephants.
5. **Ammonites** fossils indicate that the environment where they lived was warm clear shallow seas.

B Calculate the height of a mountain if the temperature at its base is 30°C and at its top is (–9°C).

Question 4

A From the opposite figure :

1. What is the name of this apparatus ?
2. Label the figure.



B Locate the position of the following atoms in the periodic table :

1. $_{10}Ne$ 2. $_{20}Ca$ 3. $_{17}Cl$ 4. $_{1}H$

8 Giza Governorate

Omranya Educational Directorate
Al-Farouk Language School

Answer the following questions :

Question 1

A Write the scientific term :

1. The number of positive protons inside the nucleus.
2. The product of dissolving nonmetallic oxides in water.
3. The alkali elements.
4. A good polar solvent for most of ionic compounds and some of covalent compounds.
5. Brightly coloured light curtains at both north and south poles of the Earth.

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كتاب المعاصر موقع ذاكرولى التعليمى الصف الثانى الاعدادى

B Study the opposite figures, then answer :

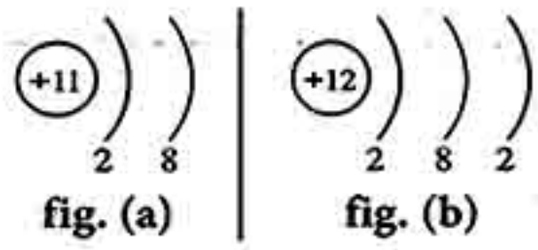


fig. (a) fig. (b)

1. Which one represents : (Positive ion – neutral atom).
2. Locate the position of the element in the periodic table (period – group).

C 1. If the temperature at the bottom of Everest mountain is 20.6°C. Find the temperature at its top if the height of the mountain is 8862 m.

2. Mention an example for each of the following :

(1) Fossil of a complete body.

(2) Endangered plant.

(3) An extinct bird recently.

Question 2

A Give reasons for :

1. Elements of the same group in the modern periodic table have similar properties.
2. Potassium reacts with water instantly and faster than sodium.
3. Rising of boiling point and freezing point of water.
4. The lower part of stratosphere is suitable for flying planes.
5. Desert ecosystem is considered as a simple ecosystem.

B 1. A metallic element (X) lies in the third period and group (1A) in the modern periodic table :

(1) Draw the electronic distribution of this element.

(2) Mention the atomic number of this element.

(3) What is the block that this element belongs to ?

(4) What is the valency of this element ?

2. Mention one importance for each of the following :

(1) Slides of silicon.

(2) Van-Allen belts.

C 1. What happens when ... ?

(1) The reaction of chlorine with the solution of potassium bromide.

(2) Dissolving magnesium oxide in water.

2. Mention one difference between :

(1) Fluorine molecule and helium molecule.

(2) The period number of an element and the group number of an element.

(3) Metals and nonmetals.

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كتاب المعاصر موقع ذاكرولى التعليمى الصف الثانى الاعدادى

Part 3

Question 3

A Correct the underlined words :

1. Transition elements start from the **second** period.
2. **Inert gases** have the properties of metals and nonmetals.
3. **Hydrogen** used in preserving eye cornea.
4. Fossils are often found in **igneous rocks**.
5. From ozone layer pollutants are **halons** which are used in cooling devices.

B Write a brief description of :

1. Global warming.
2. The relation between density of water and its temperature.

C Choose the correct answer :

1. The element, whose atomic number is (15) is similar in its chemical properties as the element whose atomic number is .....
   a. 5 b. 7 c. 17 d. 19
2. The measuring unit of the atomic size is .....
   a. micrometre. b. picometre. c. millimetre. d. millibar.
3. Ice crystal has ..... shape.
   a. hexagonal b. octagonal c. quadrant d. pentagonal
4. Meteors are formed in .....
   a. thermosphere. b. mesosphere. c. stratosphere. d. troposphere.
5. Microfossils like .....
   a. mammoth. b. ferns. c. foraminifera. d. archaeopteryx.

Question 4

A Complete the following statements :

1. Sodium is kept under ..... surface to prevent its reaction with .....
2. Troposphere extends above sea level to ..... with thickness about .....
3. Ultraviolet radiations have ..... effect, while infrared radiations have ..... effect.
4. Fossils are used in searching for ..... and indicate the age of ..... rocks.
5. ..... protectorate in USA, where ..... is protected.

B 1. What is meant by ... ?

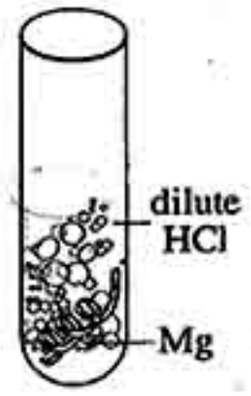
(1) Metalloids. (2) Aurora phenomenon.

2. Write the electronic distribution of elements (X , Y) with atomic numbers (10, 9) respectively and then locate them in the modern periodic table.

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C **1. Compare between acidic oxides and basic oxides according to :**
(product that dissolves in water - affect on litmus paper - giving example).

2. Study the opposite figure, then answer the questions :
(1) Write the balanced equation.
(2) What happens when approaching a lighted match to the opening of the tube.



9 Giza Governorate

6th October Educational Directorate
Om El-Moumeneen Language Schools

Answer the following questions :

Question 1

A **Write the scientific term :**
1. Safe areas established to protect the endangered animals.
2. The replica of the internal details of the living organism.
3. Weak electrostatic attraction that arises between the molecules of the polar compounds.
4. It is a phenomenon that appears as brightly coloured curtains seen at the two poles.
5. It is the process of replacing the wood material by silica to form petrified wood.
6. Decrease in the thickness of ozone layer.
7. The descending arrangement of elements according to their chemical activity.

B **Calculate the height of a mountain if the temperature at its base is 30°C and at its top is (–9°C).**

C **Locate the position of the following elements in the modern periodic table :**
1. $_{17}Cl$ 2. $_{10}Ne$ 3. $_{3}Li$ 4. $_{8}O$

Question 2

A **Give reasons for :**
1. Cesium is the most active metal in group (1A).
2. Sugar dissolves in water.
3. Ozone layer exists in stratosphere layer.
4. The extinction of some animals in recent ages.

B **Mention three ways to protect water from pollution.**

C **Mention the importance of :**
1. Aneroid. 2. Liquefied nitrogen. 3. Van-Allen belts.

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الصف الثانى الاعدادى موقع ذاكرولى التعليمى كتاب المعاصر

Part 3

D Give an example for :

1. Endangered plant.
2. Amphoteric oxide.
3. Liquid element from halogens.
4. Cast fossil.

Question 3

A Complete the following statements :

1. "d" block elements are called the ..... elements.
2. ..... and ..... are from greenhouse gases.
3. There is a ..... bond between hydrogen and oxygen in water molecule.
4. Cobalt 60 has the ability to kill .....
5. The existence of the coral fossils in a certain area indicate that the environment was .....
6. ..... and ..... are from ozone layer pollutants.
7. The strongest nonmetal lies in group .....
8. When the atomic number increases in the same period, the metallic property .....

B Compare between :

1. Simple ecosystem and complicated ecosystem.
2. Basic oxides and acidic oxides.

Question 4

A Choose the correct answer :

1. The degree of ozone under STP condition is..... Dobson.
   a. 100 b. 200 c. 300
2. The first protectorate in Egypt is ..... protectorate.
   a. Ras Mohamed b. Wadi El-Raiyan c. Panda
3. From the complete body fossils is .....
   a. mammoth. b. nummulites. c. fish.
4. The number of elements in the Earth's crust equals .....
   a. 118 b. 92 c. 120
5. The atmospheric pressure at the top of a mountain equals ..... bar.
   a. 1 b. 0.05 c. 1.88
6. ..... is an example of microfossils.
   a. Ferns b. Foraminifera c. Archaeopteryx

B Mention the role of the following scientists :

1. Moseley.
2. Bohr.

C Complete the equations :

1. $Cl_2 + 2KBr \longrightarrow$ ..... + ...
2. $2Na + 2H_2O \longrightarrow$ ..... + ...

هذا العمل خاص بموقع ذاكرولى التعليمى ولا يسمح بتداوله على مواقع أخرى

10 **Giza Governorate**

Abu El-Nomrous Directorate
Future Generation Language School

Answer the following questions :

Question 1

A Choose the correct answer :

1. ..... is/are used in extinguishing fires.
   a. Methyl bromide b. Halons c. Nitrogen oxides d. UV radiation
2. The second layer of atmosphere is called .....
   a. mesosphere. b. troposphere. c. stratosphere. d. thermosphere.
3. The transition elements start to appear from the beginning of the ..... period.
   a. second b. third c. fourth d. fifth
4. All of the following are from endangered species except .....
   a. papyrus plant. b. bald eagle. c. quagga. d. rhinoceros.
5. p-block contains ..... groups.
   a. 10 b. 2 c. 6 d. 8
6. All of the following are greenhouse gases except .....
   a. CO_2 b. O_2 c. N_2O d. CH_4
7. Group (B) contains ..... elements.
   a. halogens b. nonmetals c. transition d. metalloids
8. The inert gas that has the same electronic structure as (Na^+) is .....
   a. $_{10}Ne$ b. $_{2}He$ c. $_{18}Ar$ d. $_{17}Cl$

B Give reasons for :

1. The lower part of stratosphere is suitable for flying planes.
2. It is difficult to identify semi-metals based on the electronic configuration.

C If the temperature at the sea level is 39.5°C, find the temperature at the top of a mountain of height 3650 m above the Earth's surface.

Question 2

A Put (✓) or (✗) and correct the wrong ones :

1. All periods start with a metal element. ( )
2. Hofmann's voltameter is used for water ionization. ( )
3. Mesosphere is the layer which is responsible for burning of meteors. ( )
4. Ozone layer totally absorbs all kinds of ultraviolet radiations. ( )
5. Tellurium is a metalloid. ( )
6. Complicated ecosystem contains two species. ( )
7. Petrified woods look like rocks and are considered as fossils. ( )
8. Altimeter is a kind of barometers. ( )

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الصف الثانى الاعدادى موقع ذاكرولى التعليمى كتاب المعاصر

Part 3

B What do the following numbers indicate ... ?

1. 118 2. 104.5° 3. 100°C 4. 1013.25 mb

C Compare in a table between groups (1A) and (7A).

Question 3

A Complete the following statements :

1. The safe areas established to protect endangered species are called .....
2. ..... causes liver cancer.
3. $MgO + H_2O \longrightarrow$ .....
4. ..... is responsible for the high boiling point of water.
5. The satellites rotate around the Earth in ..... layer.
6. The scientist ..... discovered the main energy levels.
7. Mammoth fossil is preserved in .....
8. Water has ..... effect on litmus paper.

B What happens when ... ?

1. Storing water in plastic bottles of mineral water.
2. Increasing the numbers of cars in streets.
3. Element loses an electron.
4. Ozone layer disappeared.

C Arrange the following elements in an ascending order according to the metallic property and give a reason :

Sodium ($_{11}Na$) – Magnesium ($_{12}Mg$) – Potassium ($_{19}K$) – Cesium ($_{55}Cs$)

Question 4

A Write the scientific term :

1. The measuring unit of the atomic size of an element.
2. The region between troposphere and stratosphere.
3. The number of protons inside the nucleus of the atom of an element.
4. The halogen which exists in a solid state.
5. Remains of old living organisms that are preserved in sedimentary rocks.
6. The permanent change of water by adding any substance.
7. The descending arrangement of elements according to their chemical activity.
8. They are safe areas established to protect endangered species in their homeland.

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B **Locate the position of the following elements in the periodic table (show their configuration) :**

1. Calcium ($_{20}Ca$).
2. Silicon ($_{14}Si$).

C **What is meant by ... ?**

1. Ozone layer.
2. Electronegativity.

11 Alexandria Governorate — Middle Educational Zone — New S.L.S. "Girls"

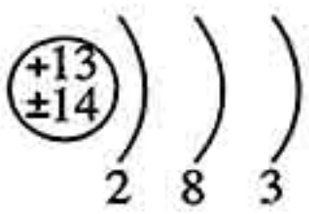
Answer the following questions :

Question 1

A **Write the scientific term of each of the following :**

1. The scientist who discovered that the atom contains positive protons in the nucleus.
2. Elements which have properties of metals and nonmetals.
3. Adding any substance to the water which changes its properties, affects the health and life of living organisms.
4. The weight of air column on a unit area ($1m^2$).
5. Two magnetic belts surrounding ionosphere and play an important role in scattering harmful charged cosmic radiations.
6. The continuous increase in the average temperature of the Earth's near surface air due to the greenhouse effect.
7. Traces and remains of old living organisms that are preserved in sedimentary rocks.
8. The continuous decrease without compensation in the number of a certain species until all the members of species die out.
9. The apparatus which is used for water electrolysis.
10. A mammal between horse and zebra that extinct recently due to overhunting.
11. The ability of the atom to attract the electrons of the covalent bond towards itself.

B **Look at the opposite figure, then find the location of this element in the modern periodic table. Mention the block of this element.**



Question 2

A **Give reasons for :**

1. Atomic size decreases in the period from left to right.
2. Reaction of potassium with water is stronger than that of sodium with water.
3. Pilots prefer to fly their planes in stratosphere layer.
4. Silicon slides are used in making electronics as computers.

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كتاب المعاصر موقع ذاكرولى التعليمى الصف الثانى الاعدادى

Part 3

B Choose from column (B) what suits it in column (A) :

(A)	(B)
1. $2Na + 2H_2O \longrightarrow$	a. unit of measuring the thickness of ozone layer.
2. $Br_2 + 2KI \longrightarrow$	b. is from endangered species.
3. Coral fossils	c. $2NaOH + H_2$
4. Dobson	d. extinct because it has small wings so, it was easy to get hunted.
5. Dodo bird	e. $2KBr + I_2$
6. Papyrus plant	f. showed that the environment where they lived was clear, warm and shallow seas.

C Correct the underlined words in each of the following statements :

1. Pure water has **acidic** effect on litmus paper.
2. Ultraviolet radiation has **thermal** effect on the Earth.
3. Increasing the concentration of mercury in water causes **liver cancer**.
4. **Snow** is a solidified resinous matter secreted by pine trees.

Question 3

A Find the temperature at a point of height 10 km above sea level, if the temperature at sea level is 24°C.

B Complete each of the following statements :

1. ..... is from the examples of polar compounds because the difference in electronegativity between its elements is relatively .....
2. ..... classified the elements in his table according to their properties and atomic mass.
3. ..... is a type of barometers used to determine the possible day weather.
4. ..... is from the factors that cause extinction of species.
5. Microfossils (foraminifera and radiolaria) help in ..... exploration.
6. $Mg + 2HCl \xrightarrow{dil.}$ ..... + ...
7. ..... and ..... are from greenhouse gases.
8. ..... fossils indicate the age of sedimentary rocks.

Question 4

A Choose the correct answer :

1. ..... protectorate is a natural protectorate in USA where grey bear is protected.
   a. Ras Mohamed b. Wadi El-Raiyan c. Bluestone d. Panda
2. Ozone layer prevents (100 %) of ..... ultraviolet rays from passing to the Earth.
   a. near b. medium c. far d. (a) and (b) together

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كتاب المعاصر موقع ذاكرولى التعليمى الصف الثانى الاعدادى

3. The modern periodic table contains ..... elements.

a. 26 b. 92 c. 100 d. 118

4. Which of the following is an acidic oxide ? .....

a. CO_2 b. MgO c. Na_2O d. FeO

5. Which of the following is a radioactive element which is used in food preservation ? .....

a. Liquid sodium. b. Liquefied nitrogen.

c. Cobalt 60. d. Water.

6. Which of the following is correct about alkali metals ? They .....

a. have high density. b. are monovalent.

c. are bad conductors of electricity. d. form negative ions.

7. Water has high boiling point due to the presence of ..... bonds between its molecules.

a. hydrogen b. ionic c. covalent d. metallic

8. ..... added group zero in his table for noble gases.

a. Mendeleev b. Moseley c. Rutherford d. Einstein

9. Which of the following is the halogen that exists in a solid state ? .....

a. Fluorine. b. Chlorine. c. Bromine. d. Iodine.

10. When putting a glass bottle completely filled with water in the freezer, it breaks because when water freezes its ..... increases.

a. temperature b. density c. volume d. acidity

11. Which of the following elements don't react with water ? .....

a. K and Na b. Ca and Mg c. Zn and Fe d. Cu and Ag

12. What is the volume of hydrogen gas evolved from electrolysis of acidified water if you know that the volume of oxygen gas evolved is 2 cm^3 ? .....

a. 1 cm^3 b. 2 cm^3 c. 4 cm^3 d. 6 cm^3

B Mention the type of the fossils shown in the following figures :

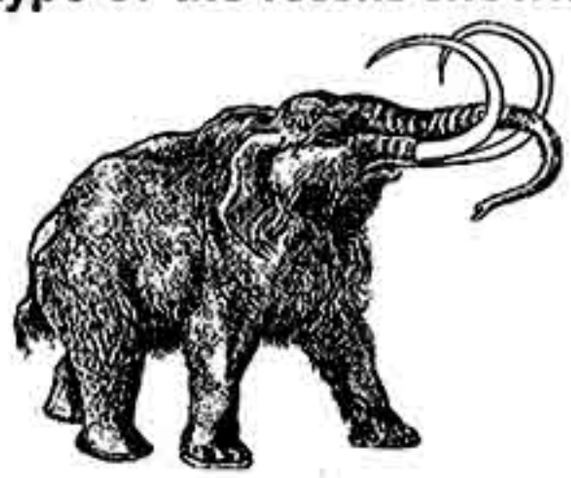


fig. (1)



fig. (2)

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الصف الثانى الاعدادى موقع ذاكرولى التعليمى كتاب المعاصر

Part 3

12 Alexandria Governorate — El-Agamy Educational Zone

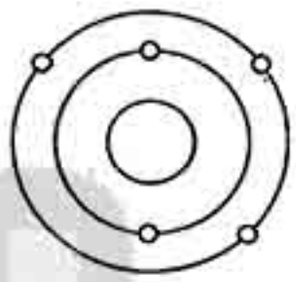
Answer the following questions :

Question 1

A Complete the following statements :

1. From types of fossils are ..... and .....
2. The new number for group (6A) is .....
3. $Mg + 2HCl \xrightarrow{dil.}$ ..... + ...
4. The coldest layer in atmosphere is called ..... , while the hottest layer is called .....
5. $2NaBr + Cl_2 \longrightarrow$ ..... + ...
6. The nuclear reactors cause ..... pollution for water.

B Look at the opposite figure, then calculate :



1. The atomic number of the element follows it in the same period.
2. The atomic number of the element follows it in the same group.

Question 2

A Choose the correct answer :

1. Fossils are often formed in ..... rocks.
   a. metamorphic b. sedimentary c. igneous
2. From the extinct species is .....
   a. dodo bird. b. lion. c. panda.
3. ..... form positively charged ions when they enter in a chemical reaction
   a. Inert gases b. Halogens c. Alkali metals
4. The unit of measuring the degree of ozone is .....
   a. km. b. litre. c. dobson.
5. From the endangered species is .....
   a. bald eagle. b. passenger pigeon. c. tasmanian cat.
6. The device that is used for determining the elevation from sea level is .....
   a. aneroid. b. altimeter. c. thermometer.
7. Decreasing CO_2 gas percentage is caused by .....
   a. cutting trees. b. cultivating trees. c. burning fossils fuel.
8. All of the following elements are from semi-metals except .....
   a. silicon. b. boron. c. bromine.
9. The atmospheric pressure on the top of a mountain is ..... the atmospheric pressure at the sea level.
   a. more than b. less than c. equal to

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الصف الثانى الاعدادى موقع ذاكرولى التعليمى كتاب المعاصر

B **Calculate the temperature at the top of a mountain if you know that the temperature at its foot is 26°C and its height is 4 km.**

Question 3

A **Write the scientific term :**

1. The continuous decrease in the number of a certain species of living organisms without compensation until the last member of the species dies out.
2. Shells in the atom structure indicated by the letters K, L, M, N, O
3. Appearance of bright coloured light curtains at the two poles.
4. The weight of air column of an atmospheric height on a unit area.
5. A charged layer which reflects radio waves.
6. The continuous increase in the average temperature of the Earth.

B **Locate the following element in their position in the modern periodic table :**

1. $_{20}Ca$ 2. $_{17}Cl$ 3. $_{3}Li$ 4. $_{7}N$

Question 4

A **Give reasons for the following :**

1. Water molecule is a polar compound.
2. The lower part of stratosphere is suitable for flying planes.
3. Tropical forest is a complicated ecosystem.

B **Correct the underlined words :**

1. **Sodium** is used in making electronic slides.
2. Cobalt 60 is used in preservation of **cornea of eye**.
3. When water freezes, its **density** increases.
4. The ozone hole appears above the **middle east**.

13 Alexandria Governorate — Al-Gomrok Educational Zone

Answer the following questions :

Question 1

A **Choose the correct answer :**

1. The temperature at the top of mesosphere layer reaches .....
   a. – 60°C b. – 90°C c. 0°C d. 120°C
2. The strongest metal locates in group .....
   a. 2A b. 1A c. 7A d. zero

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الصف الثانى الاعدادى موقع ذاكرولى التعليمى كتاب المعاصر

Part 3

3. ..... is an example of extinct species.

a. Panda bear b. Bald eagle c. Quagga d. Papyrus plant

4. If the atomic number of an element is 15, so the electronic configuration of its ion is .....

a. (2,8,8). b. (2,8). c. (5,8,5). d. (2,5,8).

5. The gas produced from the reaction between sodium bicarbonate and vinegar is .....

a. CH_2 b. N_2O c. H_2 d. CO_2

B What happens in the following cases ... ?

1. Decrease in water temperature less than 4°C.
2. Storing tap water in plastic bottles of mineral water.

C Locate the position of these elements in the modern periodic table :

1. $_2He$ 2. $_{19}K$ 3. $_7N$

Question 2

A Write the scientific term :

1. The continuous decrease in the number of species without compensation until all die out.
2. The hottest layer in the atmosphere.
3. The elements which have the properties of both metals and nonmetals.
4. They are safe areas established to protect the endangered species in their homeland.
5. The radioactive element that is used in food preservation.

B Compare between :

Mendeleev's periodic table and modern periodic table.

C Mention one use or importance for the following :

1. Hofmann's voltameter. 2. Liquefied nitrogen. 3. Van-Allen belts.

Question 3

A Complete the following statements :

1. The fossils are found in ..... rocks.
2. Increasing the concentration of ..... in water causes the death of brain cells.
3. $Br_2 + 2KI \longrightarrow$ ..... + ...
4. The snow crystal has ..... shape.

B If a mountain, its height is 6000 m and the temperature at its base is 30°C. Calculate the temperature at its top.

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كتاب المعاصر موقع ذاكرولى التعليمى الصف الثانى الاعدادى

C Mention one example for :

1. An element doesn't react with water.
2. A type of microfossils which is considered a guide for existence of petroleum.
3. An endangered bird.

Question 4

A Correct the underlined words :

1. **Methyl bromide** used in extinguishing fires.
2. The unit of measuring the degree of ozone layer is **bar**.
3. Ca and **Na** react slowly with water.
4. **Lithium** is the strongest metallic element in group (1A).
5. **O_2** is from greenhouse gases.

B Give reasons for the following :

1. Freon gas has bad effects on the environment.
2. By increasing the atomic number among groups, the atomic size increases.
3. Amber is considered a suitable medium for formation of complete body fossils.

C Write the balanced chemical equations representing each of the following :

1. Magnesium with hydrochloric acid.
2. Reaction of sodium with water.

14 El-Qalyoubia Governorate — Banha Educational Zone

Answer the following questions :

Question 1

A Choose the correct answer :

1. All of the following elements are from semi-metals except .....
   a. tellurium. b. silicon. c. boron. d. bromine.
2. The strongest metal locates in group .....
   a. 2A b. 1A c. 1B d. 7A
3. Ozone layer doesn't allow the passage of ..... ultraviolet rays.
   a. near b. medium
   c. far d. all the previous answers
4. There are ..... bonds between water molecules.
   a. hydrogen b. covalent
   c. ionic d. all the previous answers

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Part 3

5. Fossils are found in .....rocks.
   a. igneous b. sedimentary
   c. metamorphic d. all the previous answers
6. All of thc following arc cndangcrcd spccics cxccpt .....
   a. panda bear. b. bald eagle. c. quagga. d. rhinoceros.

B Give reasons for :

1. Elements of the same group have similar properties.
2. The use of radioactive cobalt 60 in food preservation.
3. The infrared radiation cannot penetrate the Earth's atmosphere.
4. Establishing a gene bank for the endangered species.

C Find the temperature at the top of a mountain, its height is 3 km, if the temperature at the sea level is 15°C. Is snow formed or not and why ?

Question 2

A Write the scientific term :

1. The continuous increase in the average temperature of the Earth's near-surface air.
2. Fossils used in determination of the age of rocks.
3. A charged layer which reflects radio waves.
4. The arrangement of metals in a descending order according to their chemical activity.
5. The ability of the atom in a covalent molecule to attract the electrons of the chemical bond towards itself.
6. It is the path of energy that transmits from a living organism to another in the ecosystem.

B How can you differentiate chemically between each of the following ?

1. Copper and zinc (by adding HCl). Write the balanced chemical equation.
2. Magnesium oxide and sulphur oxide.

C Locate the position of the following elements in the modern periodic table :

1. $_{20}Ca$ 2. $_{10}Ne$ 3. $_{17}Cl$ 4. $_{8}O$

Question 3

A Put (✓) or (✗) and correct the wrong ones :

1. Water and ammonia are non-polar compounds. ( )
2. Liquefied sodium is used in preservation of cornea of the eye. ( )
3. The atomic size decreases in periods as the atomic number increases. ( )
4. Lacking of plants on the Earth leads to the increase in the temperature. ( )
5. Quagga is an extinct animal in the recent times. ( )

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B Mention one importance or use for :

1. Altimeter.
2. Foraminifera microfossil.
3. Silicon.
4. Mesosphere.

C Complete the following equations :

1. $CO_2 + H_2O \longrightarrow$ .....
2. $Br_2 + 2KI \longrightarrow$ ..... + ...
3. $2Na +$ ..... $\longrightarrow 2NaOH +$ ..... ↑
4. $2H_2O \xrightarrow{\text{electrolysis}}$ ..... ↑ + ... ↑

Question 4

A Correct the underlined words :

1. Elements in group (1A) are known as **halogens**.
2. **Mammoth** is one of the examples of petrified fossils.
3. Ozone degree is measured in **picometre** unit.
4. Each period ends with **a nonmetal**.

B What happens when ... ?

1. Putting lithium in kerosene.
2. Drinking water polluted with mercury.
3. Increasing the use of CFC_s on Earth.
4. Mixing of animal and human wastes in water.

C Compare between (related to definition and examples) :

1. Simple ecosystem and complicated ecosystem.
2. Cast and mold.

15 El-Sharkia Governorate — West Zagazig Admin.

Answer the following questions :

Question 1

A Choose the correct answer :

1. Elements of the modern periodic table are classified into ..... block(s).
   a. one b. two c. three d. four
2. ..... is an atom of a non-metallic element which gains an electron or more during the chemical reaction.
   a. Positive ion b. Negative ion
   c. Excited atom d. No correct answer

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Part 3

3. All of the following are greenhouse gases except .....
a. O_2 b. CO_2 c. N_2O d. CH_4

4. The ozone degree is measured by a unit called .....
a. km. b. mm^2 c. dobson. d. millibar.

B Give reasons for :

1. Sodium is kept under the surface of kerosene.
2. Ionosphere layer is important for radio stations.

C What is meant by ... ?

1. Water pollution.
2. Global warming phenomenon.

Question 2

A Put (✓) or (✗) and correct the wrong ones :

1. Ferns fossils indicate that the environment where they lived was a sea floor. ( )
2. The boiling point of liquefied nitrogen is (– 196°C). ( )
3. Stratopause is the region between stratosphere and troposphere. ( )
4. Tropical forest is an example of complicated ecosystem. ( )

B What is the importance of ... ? (give only one use)

1. Cobalt 60
2. Fossils.

C Locate the position of the following elements in the modern periodic table :

1. $_{10}Ne$
2. $_{19}K$

Question 3

A Complete the following sentences :

1. Mendeleev arranged the elements ascendingly according to ....., while Moseley arranged them ascendingly according to .....
2. Archaeopteryx is the link between ..... and .....
3. The highest temperature layer in the atmosphere is ..... and the least temperature one is .....
4. Group (1A) is called ..... , but group (7A) is called .....

B Give one example for :

1. An extinct bird.
2. A polar compound.
3. Severe climatic changes.
4. An endangered plant.

C What happens when ... ?

The absence of one type of species from the simple ecosystem.

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Question 4

A Write the scientific term :

1. The solidified resinous matter which was secreted by pine trees during old geologic ages.
2. The bond between water molecules.
3. A gas which is important for building ozone gas.
4. A phenomenon that appears as brightly coloured light curtains seen at the both poles of the Earth.

B Compare between :

1. Trace and remains.
2. Troposphere and stratosphere.

C Write the chemical equation which represents the following reactions :

1. Magnesium with dilute hydrochloric acid.
2. Carbon dioxide with water.

16 El-Menofia Governorate — Shebin El-Kom Directorate

Answer the following questions :

Question 1

A Complete the following sentences :

1. In the periodic table, the elements which are identical in properties lie in the same .....
2. Mendeleev had to deal with the ..... of one element as different elements, because they are different in their .....
3. d-block contains ..... elements.
4. $2Na + 2H_2O \longrightarrow$ ..... + ...
5. Among the most famous types of barometers are ..... and .....
6. Types of fossils differ according to their way of .....
7. The snow crystal's shape is ..... and its density is ..... than water density.

B Locate the position of the following elements in the modern periodic table :

1. $_{1}H$
2. $_{10}Ne$
3. $_{20}Ca$

Question 2

A Write the scientific term :

1. They are the elements which have the properties of both metals and nonmetals.
2. A table in which the elements are arranged according to their atomic numbers.
3. It is the curved lines that join the points of equal pressure in atmospheric pressure maps.
4. Safe places are specialized for protecting endangered species in their homeland.

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Part 3

B Give reasons for :

1. Cesium (Cs) is considered one of the strongest metallic elements.
2. Mesosphere layer is highly rarefied (vacuumed).
3. Petrified woods are considered from fossils although they look like rocks.

C Complete the following equation :

$Br_2 + 2KI \longrightarrow$ ..... + ...

Question 3

A Put (✓) or (✗) and correct the wrong ones :

1. The solutions produced from dissolving the nonmetal oxides in water, turn the violet litmus solution into red. ( )
2. Copper (Cu) and silver (Ag) react very slowly with cold water. ( )
3. Bohr had discovered the main energy levels. ( )
4. Ferns fossils indicate that the environment where they lived was a sea floor. ( )

B Compare between the following :

1. Chlorine and bromine. (according to : the physical state and chemical activity)
2. Simple ecosystem and complicated ecosystem. (according to : definition and examples)

C Arrange the following elements in a descending order according to the metallic property ? Why ? ($_{11}Na - _{12}Mg - _{19}K$)

D Calculate the height of a mountain if the temperature at its foot is 30°C and at its top is (– 9°C).

Question 4

A What is meant by each of the following ... ?

1. Global warming phenomenon.
2. Trace.
3. The degree of ozone above an area is 300 dobson.

B Mention one example for :

1. Element used in food preservation.
2. Mold.
3. Cast.

C What happens in the following situations ... ?

1. Putting a hot water container in the freezer and close the fridge.
2. Dipping of old insects in resinous matter and the matter solidifies.
3. Mixing of animal and human wastes with water.

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17 El-Dakahlia Governorate — Educational Directorate

Answer the following questions :

Question 1

A Using the following diagram which represents a part of the periodic table, answer the following questions :

$_1H$																	$_2He$
3	X											5	6	Y	8	9	10
11	12														Z	17	G
19	M				N											35	$_{36}Kr$

1. **Write the letter(s) of the element(s) which is/are :**
   (1) among transition elements.
   (2) located in period (3) and group (6A).
   (3) among noble gases.
   (4) considered among s-block.
   (5) considered among p-block.
2. **Choose :**
   (1) The letter (Y) represents ..... element.
   a. $_9F$ b. $_8O$ c. $_{12}Mg$ d. $_7N$
   (2) The letter (M) represents ..... element.
   a. $_{12}Mg$ b. $_{16}S$ c. $_{20}Ca$ d. $_{18}Ar$
   (3) The letter (N) is located in ..... block.
   a. s b. p c. d d. f
3. **What is the atomic number of the elements (N) and (G) ?**

B Problem :

If the temperature at sea level is 24.5°C, find the temperature at the top of troposphere layer if its thickness is 13 kilometre.

Question 2

A Choose the correct answer :

1. The properties of the element which has atomic number equals 17 are similar to the element which has atomic number equals .....
   a. 7 b. 9 c. 15 d. 20
2. ..... is the lowest metallic element is group (1A).
   a. Na b. Cs c. K d. Li

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Part 3

3. The oxide which dissolves in water and produces an acid is .....
   a. MgO b. FeO c. CuO d. CO_2
4. The gas which is evolved on reacting alkali metals with water is .....
   a. oxygen. b. nitrogen. c. hydrogen. d. helium.
5. The volume of hydrogen gas evolving from water electrolysis is ..... the volume of oxygen gas.
   a. equal to b. twice c. half d. four times
6. One dobson unit is defined as .....
   a. 3 mm. b. 0.1 mm. c. 0.01 mm. d. 2 mm.

B "Ozone layer is found in the stratosphere layer, it's important to protect the life of organisms"

1. What is the average thickness of ozone layer in atmosphere ?
2. What is the only element that forms ozone gas ?
3. Complete :
   a. Ozone layer protects the Earth from the harmful effects of ..... radiation.
   b. The thickness of ozone layer at STP is .....
4. Put (✓) or (✗) :

   Ozone layer prevents penetration of all types of UV radiation. ( )

Question 3

A Give reason for each of the following :

1. Mammoth fossil is preserved as a complete body fossil.
2. Naming the bald eagle by this name.
3. Water molecule is from polar compounds.
4. The global warming phenomenon has negative effects on Earth.

B Arrange the following fossils starting with first appearance on the life stage with explanation :

(Cast fossil of fish – Mammoth fossil – Trilobite fossil – Archaeopteryx fossil)

Question 4

A Write the scientific term of each of the following :

1. The continuous decrease in the number of a certain species of living organisms, without compensation until they all die out.
2. A group of food chains connected with each other.
3. The environmental system that is not affected severely by the absence of one species of living organisms that live in it.

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4. An aquatic plant used by pharaohs to manufacture writing papers.
5. Traces and remains of old living organisms that are preserved in the sedimentary rocks.
6. Safe places that are specified to protect the endangered species in their homeland.

B Calculate :

The percentage of erosion of ozone layer in a certain area, knowing that ozone degree at this area is 255 dobson.

18 Ismailia Governorate — Educational Directorate

Answer the following questions :

Question 1

A Choose the correct answer :

1. Elements of group (7A) are known as .....
   a. inert gases. b. alkali metals.
   c. halogens. d. alkaline Earth metals.
2. Meteors are burnt in ..... layer.
   a. ionosphere b. stratosphere c. mesosphere d. thermosphere
3. Elements of the same period in the modern periodic table have the same .....
   a. number of energy levels. b. atomic number.
   c. number of electrons in the outermost energy level. d. valency.
4. ..... protectorate is the first one established in Egypt.
   a. Ras Mohamed b. Wadi Hetan c. Saint Cathrine d. Petrified forest
5. Metal oxides are ..... oxides.
   a. acidic b. basic c. both of them d. no correct answer
6. All of the following are greenhouse gases except .....
   a. CO_2 b. O_2 c. N_2O d. CH_4
7. Fossils are preserved in ..... rocks.
   a. sedimentary b. igneous c. metamorphic d. no correct answer
8. There are ..... bonds between water molecules.
   a. ionic b. covalent c. hydrogen d. metallic

B Give reasons for the following :

1. The lower part of stratosphere is suitable for flying aeroplanes.
2. Simple ecosystem is affected strongly by the absence of one of its species.
3. The atomic size increases by increasing the atomic number within the same group in the modern periodic table.
4. Stopping producing concorde aeroplanes.

C Mention one use for the following elements :

1. Radioactive cobalt 60.
2. Liquefied nitrogen.

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Part 3

Question 2

A Correct the underlined words :

1. The ozone layer is found in **thermosphere** layer.
2. Ferns fossils indicate that the environment where they lived was **a sea floor**.
3. $Mg + 2HCl \xrightarrow{dil.} \underline{Mg + Cl_2}$
4. **Aneroid** is an instrument used to determine the elevation of aeroplanes above sea level.
5. Ice crystals have **round** shape and large volume.
6. **Copper** reacts instantly with water and hydrogen gas evolves.
7. Elements of **p-block** are organized in two groups.

B What happens when... ?

1. Ascending up in troposphere (concerning : temperature and atmospheric pressure).
2. Existence of ozone in conditions of standard temperature and pressure (STP).

C If the temperature at the base of a mountain = 30°C and its height = 2000 m, Find the temperature at its top.

D Mention three ways to protect living organisms from extinction.

Question 3

A Complete the following sentences :

1. Most of weather phenomena happen in ..... layer.
2. Transition elements start to appear from period number ..... in the modern periodic table.
3. Archaeopteryx is the link between birds and .....
4. The ozone layer doesn't allow the penetration of all ..... ultraviolet rays.
5. ..... is an example of polar compounds.
6. Increasing of mercury concentration in drinking water causes .....
7. Fluorine and chlorine exist in ..... state.
8. ..... is from the negative effects of global warming phenomenon.

B Locate the position of the following elements in the modern periodic table :

1. $_{20}Ca$
2. $_{18}Ar$

C Mention one example for each of the following :

1. Fossils are found in El-Mokattam mountain.
2. One element from alkali metals.
3. An endangered bird.
4. A metalloid element.

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Question 4

A Write the scientific term of each of the following :

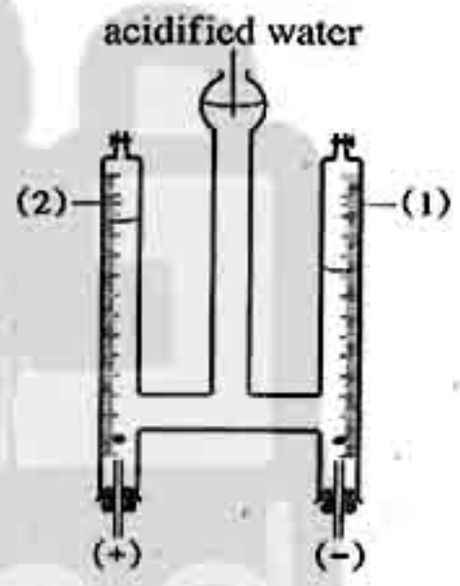
1. A charged layer reflects radio waves.
2. A kind of water pollution, which causes many diseases as typhoid.
3. The ability of the atom in a covalent molecule to attract the electrons of the chemical bond towards itself.
4. Replacing part by part, the wood material of the trees by silica to form petrified fossils.
5. The continuous increase in the temperature of the Earth's near-surface air.
6. The region between stratosphere and mesosphere at which the temperature remains constant.
7. A famous extinct animal in ancient periods.

B Choose the odd word out :

1. ${}_{2}He$ / ${}_{10}Ne$ / ${}_{18}Ar$ / ${}_{11}Na$
2. Dodo bird / Quagga / Papyrus plant / Mammoth.
3. Cast / Fossil of a complete body / Fossil record / Petrified fossils.

C Examine the opposite figure, then answer :

1. What is the name of this device ?
2. Label the numbers (1) and (2) ?
3. Write down the balanced symbolic equation which represents the reaction.



19 Damietta Governorate — Damietta Educational Directorate

Answer the following questions :

Question 1

A Complete the following sentences :

1. The atomic size is measured by ....., but the atmospheric pressure is measured by .....
2. The ultraviolet radiation has a ..... effect and the infrared radiation has a ..... effect.
3. Eating fish which contains high concentration of lead causes ..... , but drinking water which contains high concentration of mercury leads to .....
4. The highest temperature layer in the atmosphere is ..... and the least temperature one is .....
5. Basic oxides are ..... oxides and their solutions turn the litmus solution into .....

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Part 3

B Mention the importance of each of the following :

1. Ozone layer.
2. Hofmann's voltameter.
3. Cobalt 60

C Locate the position of the following elements in the modern periodic table : (With drawing)

1. $_{17}Cl$
2. $_{20}Ca$
3. $_{10}Ne$

Question 2

A Write the scientific term of the following :

1. The ability of the atom in a covalent molecule to attract the electrons of the chemical bond towards itself.
2. The halogen which exists in a liquid state.
3. The death of all members of certain species of living organisms.
4. A type of ultraviolet radiations that penetrates the ozone layer by a percentage 100%
5. Safe places established to protect endangered species in their natural environment.
6. The weight of air column of an atmospheric height above a unit area.

B Mention one example for each of the following :

1. An endangered bird.
2. A complete body fossil.
3. A metalloid element.
4. An extinct bird.
5. A polar compound.

C Calculate the height of a mountain if the temperature at its foot is (30°C) and at its top is (– 6°C).

Question 3

A Choose the correct answer :

1. The degree ozone layer is measured by a unit called .....
   a. km. b. dobson. c. nanometre. d. mm^3
2. Fossils are often found in ..... rocks.
   a. metamorphic b. volcanic c. sedimentary d. igneous
3. The coldest atmospheric layer is .....
   a. troposphere. b. stratosphere. c. mesosphere. d. thermosphere.
4. The ..... form positive ions during chemical reactions.
   a. noble gases b. nonmetals c. alkali metals d. halogens
5. ..... react very instantly with water and hydrogen gas evolves.
   a. K and Na b. Cu and Ag c. Zn and Fe d. Ca and Mg

B Write the balanced chemical equations which express the following reactions :

1. Magnesium with dil. hydrochloric acid.
2. Sodium with water.
3. Bromine with potassium iodide.

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C Mention the harms of :

1. Storing water in plastic bottles of mineral water.
2. Melting the polar ice.
3. Overuse of freon.

Question 4

A Give reasons for :

1. The lower part of stratosphere is suitable for flying aeroplanes.
2. Petrified woods are considered from fossils although they look like rocks.
3. Dissolving of sugar in water although it is among covalent compounds.
4. Occurrence of aurora phenomenon.

B What is meant by ... ?

1. Fossils.
2. Chemical activity series.
3. Greenhouse effect.

C Correct the underlined words :

1. Elements of d-block contain **lanthanides**.
2. **Quagga** is the most famous extinct animal in the old times.
3. Meteors burn in **thermosphere** layer.

20 Kafr El-Sheikh Governorate — Educational Directorate

Answer the following questions :

Question 1

A Choose the correct answer :

1. ..... is a polar compound.
   a. Petrol b. Water c. Alcohol
2. The main energy levels discovered by Bohr in the atom are .....
   a. 7 b. 5 c. 3
3. The first layer in the atmospheric envelope above the sea level is .....
   a. mesosphere. b. stratosphere. c. troposphere.
4. Mammoth was preserved in .....
   a. resinous matter. b. snow. c. mud sediments.

B Write the scientific term of each of the following :

1. One of components of the atmosphere that its percentage increased in recent years causing the greenhouse phenomenon.

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Part 3

2. Safe places established to protect endangered species in the natural places.

3. A table in which the elements are arranged according to their atomic numbers and the way of filling the energy sublevels with electrons.

Question 2

A Give reason for each of the following :

1. Petrified woods are considered from fossils although they look like rocks.
2. The atomic size increases in the same group by increasing the atomic number.
3. Governments put laws for regulating the process of hunting of some living organisms.
4. Halogens don't exist individually in nature, but they exist in chemical compounds.

B Give a brief definition for each of the following :

1. Chemical activity series.
2. Exosphere.
3. Fossils.

Question 3

A Mention the effects resulting from the following :

1. Putting in the freezer of the fridge a closed bottle completely filled with water.
2. Extinction of one species or more from a simple balanced ecosystem.
3. Sediments fill a snail shell cavities, then later it solidifies and the shell is removed.
4. On going above sea level.

B Put (✓) in front of the right statements and (✗) in front of the wrong statements :

1. Nonmetal oxides dissolve in water forming acidic solutions. ( )
2. Meteors burn in the mesosphere. ( )
3. Silicon slides are good conductors of electricity. ( )

Question 4

A Illustrate with chemical equations only the reactions of the following :

1. The formation of ozone by the effect of ultraviolet radiation.
2. Forming a salt of an acid when dilute acid is added to a metal.
3. Decomposition of acidified water by electricity into two elements hydrogen and oxygen.

B Complete the following statements :

1. ..... is the layer in the atmospheric envelope which contains most of the ozone which is located between 20 to ..... km above sea level.
2. Alkali metals are good conductors of ..... and .....

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21 El-Behiera Governorate — Bani El-Delengate Official School

Answer the following questions :

Question 1

A Choose the correct answer :

1. Satellites orbit in ..... layer.
   a. stratosphere b. exosphere c. mesosphere d. thermosphere
2. Ozone degree is measured by a unit called .....
   a. km. b. millibar. c. dobson. d. nanometre.
3. Which of the following fossils indicates that the environment, where they lived was a hot and rainy tropical environment ? .....
   a. Nummulites fossils. b. Ferns fossils.
   c. Coral fossils. d. Archaeopteryx fossils.
4. All of the following are ozone pollutants except .....
   a. methyl bromide gas. b. CO_2 c. halons. d. CFC_s

B Mention the harms of :

1. Drinking water contains high concentration of mercury.
2. Global warming phenomenon. (one harm)

C Mention one use for each of the following :

1. Liquefied nitrogen. 2. Coral fossils. 3. Van-Allen belts.

Question 2

A From the following diagram which represents a part of the periodic table, answer the following questions :

E												D			G		
A	B												L		R	H	
C					N												

[NB. The letters in the table don't represent the actual symbols of the elements]

1. Arrange the elements B, A, R, L descendingly according to the atomic size.
2. Complete the following :
   The shaded part represents ..... elements.
3. Write the letter(s) of the element(s) which :
   (a) Belong(s) to d-block. (b) is/are from inert gases.
   (c) Belong(s) to alkali metals.

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كتاب المعاصر موقع ذاكرولى التعليمى الصف الثانى الاعدادى

Part 3

B Write the scientific term of each of the following :

1. It is a series in which metals are arranged in a descending order according to their chemical activity.
2. It is addition of any substance to the water which causes continuous gradual change in water properties affecting the health and the life of living creatures.
3. A type of ultraviolet radiations that is absorbed (95%) by the ozone layer.
4. It is the continuous decrease without compensation in the number of certain species of living organisms until all members of species die out.
5. It is the solidified resinous matter which was secreted by pine trees in old geologic ages.

C Compare between each of the following :

1. Sodium ($_{11}Na$) and calcium ($_{20}Ca$).
   (According to : the position in the modern periodic table and the reaction with water)
2. Remains and mold. (according to : definition and example).

Question 3

A Complete the following sentences :

1. The height of atmospheric envelope above sea level is .....km, while the normal atmospheric pressure equals ..... millibar.
2. $CO_2 + H_2O \longrightarrow$ .....
3. $Br_2 + 2KI \longrightarrow$ ..... + ...
4. Moseley arranged the elements ascendingly according to ..... , while Mendeleev arranged the elements ascendingly according to .....
5. The crystal of ice has ..... shape.

B Choose the odd word out, and find the relation between the others :

1. $_9F$ / $_6C$ / $_{35}Br$ / $_{17}Cl$
2. Dodo bird / Ibis bird / Bald eagle / Panda bear.

Question 4

A Correct the underlined words in the following statements :

1. **Ammonites** fossils are found in limestone rocks which form El-Mokattam mountain.
2. Infrared radiation has a **chemical** effect.
3. Hofmann's voltameter used in **thermal analysis** of acidified water.

B Calculate the temperature at the top of a mountain, which its height is 4 km. If the temperature at the base of that mountain is 24°C.

C Give reasons for :

1. Water has high boiling point.
2. Magnesium oxide is a basic oxide.
3. Ozone layer is formed in stratosphere.
4. Complicated ecosystem is not affected much by the absence of one of its species.

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الصف الثانى الاعدادى موقع ذاكرولى التعليمى كتاب المعاصر

22 El-Fayoum Governorate — Educational Directorate

Answer the following questions :

Question 1

A Complete the following statements :

1. Mendeleev arranged the elements ascendingly according to ..... , while Moseley arranged them ascendingly according to .....
2. The highest temperature layer in the atmosphere is ..... and the least temperature one is .....
3. Dodo bird is ..... bird, while bald eagle is ..... bird.
4. The scientist ..... discovered the main energy levels in the atom.
5. There are ..... bonds between water molecules.

B What is meant by ... ?

1. Fossils. 2. Semi-metals. 3. Atmospheric pressure.

C Locate the position of the following elements in the modern periodic table :

1. $_{10}Ne$ 2. $_{19}K$

Question 2

A Correct the underlined words in the following statements :

1. Transition elements start to appear in the **first** period.
2. Increasing O_2 concentration in the atmosphere produces the global warming phenomenon.
3. Meteors burn in **stratosphere**.
4. **Mammoth** is an example of microfossils.
5. Sodium oxide is from **acidic** oxides.
6. **Wadi El-Hetan** protectorate is the first established natural protectorate in Egypt.

B What is the importance of ... ?

1. Ozone layer. 2. Index fossils. 3. Cobalt 60

C Mention one difference between : Cast and mold.

Question 3

A Write the scientific term of each of the following statements :

1. The ability of the atom in a covalent molecule to attract the electrons of the chemical bond towards itself.

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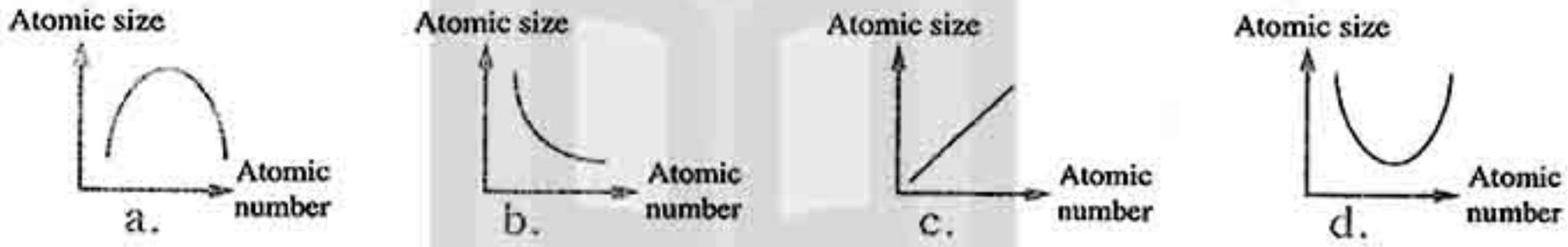
الصف الثانى الاعدادى موقع ذاكرولى التعليمى كتاب المعاصر

Part 3

2. A type of water pollution is originated from discharging of factories wastes and sewage in canals, rivers and seas.
3. The continuous decrease in numbers of species members without compensation until they all dic out.
4. Metals are arranged descendingly according to their chemical activity.
5. A charged layer reflects radio waves.

(B) Choose the correct answer :

1. ..... is located between stratosphere and mesosphere.
   a. Tropopause b. Stratopause c. Mesopause d. Thermopause
2. Graph ..... represents the graduation of the atomic size in the third period.



3. ..... is one of the most important causes of extinction in the recent ages.
   a. Volcanic eruption b. Falling of icebergs
   c. Falling of meteorites d. Overhunting and environmental pollution
4. Fossils are often found in ..... rocks.
   a. metamorphic b. sedimentary c. volcanic d. igneous
5. All of the following are from the properties of water except .....
   a. it has a neutral effect on both of litmus papers.
   b. it is a polar compound.
   c. its volume increases by freezing. d. it decomposes by heat into its elements.

(C) What are the results of ... ?

1. Sodium isn't kept under kerosene or paraffin.
2. Storing water in plastic bottles of mineral water.

Question 4

(A) Give reasons for :

1. Van-Allen belts play an important role in atmosphere.
2. Although sugar is a covalent compound, it dissolves in water.
3. Petrified woods are considered from fossils although they look like rocks.

(B) Write the balanced chemical equations which express the following reactions :

1. The reaction between bromine and potassium iodide.
2. Magnesium with dil. hydrochloric acid.

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C **Calculate the height of a mountain if the temperature at its foot is 20°C and at its top is (– 6°C).**

D **Study the following figure which represents a section of the periodic table, then answer :**

A												I	K		L		N
	C										H						O
B				D			E		F		G		J			M	

[NB. The letters in the table don't represent the actual symbols of the elements]

Write the symbol(s) which indicate(s) :

a. Halogens.

b. Inert gases.

c. The most active metal.

d. Transition elements.

23 El-Menia Governorate — St. Mark and El-Tawfik School

Answer the following questions :

Question 1

A **Choose the correct answer :**

1. The scientist ..... had discovered the main energy levels.
   a. Moseley b. Bohr c. Hofmann d. Mendeleev
2. The atomic number of an element that exists in group (7A) and period (2) is .....
   a. 12 b. 7 c. 9 d. 17
3. Each period in the periodic table starts with a/an .....
   a. metal. b. metalloid. c. nonmetal. d. inert gas.
4. ..... is considered from halogens.
   a. Sodium b. Chlorine c. Helium d. Calcium
5. Ozone layer is found in ..... layer.
   a. troposphere b. stratosphere c. mesosphere d. thermosphere

B **Write the balanced chemical equations that illustrate the following reactions :**

1. Reaction of sodium with water.
2. Reaction of magnesium with dilute hydrochloric acid.
3. Reaction of carbon dioxide gas with water.
4. Reaction of chlorine gas with potassium bromide solution.

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كتاب المعاصر موقع ذاكرولى التعليمى الصف الثانى الاعدادى

Part 3

Question 2

A Write the scientific term of each of the following :

1. The ability of the atom in a covalent molecule to attract the electrons of the chemical bond towards itself.
2. The apparatus which is used in water electrolysis.
3. The weight of air column of an atmospheric height on a unit area.
4. A unit used for measuring ozone degree.
5. The death of all members of species of living organisms.

B Problem : Calculate the height of a mountain if the temperature at its base is (30°C) and at its top is (– 9°C).

Question 3

A Complete the following statements :

1. The modern periodic table consists of ..... horizontal periods and ..... vertical groups.
2. By increasing the atomic number in groups, the atomic size ..... due to the increase in the number of .....
3. ..... and ..... are examples of polar compounds.
4. The valency of alkali metal elements is .....
5. Mixing animal and human wastes with water causes ..... water pollution, while dumping atomic wastes in oceans causes ..... water pollution.
6. The highest temperature layer in the atmosphere is ..... and the lowest temperature layer in the atmosphere is .....
7. ..... and ..... are endangered species.

B What's the importance of ... ?

1. Van-Allen belts. 2. Ozone layer. 3. Cobalt 60

C Give reasons for the following :

1. The lower part of stratosphere is suitable for flying aeroplanes.
2. Liquefied nitrogen is used in preservation of the eye cornea.

Question 4

A Choose from column (B) what suits it in column (A) :

(A) Harms	(B) Pollutant
1. Death of brain cells. 2. Liver cancer. 3. Blindness.	a. lead. b. sodium. c. mercury. d. arsenic.

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B What's meant by each of the following ... ?

1. Fossils.
2. Metalloids.
3. Aurora phenomenon.

C What will happen in each of the following cases ... ?

1. Storing water in plastic bottles of mineral water.
2. The overuse of freon.

24 Sohag Governorate — Educational Directorate

Answer the following questions :

Question 1

A Complete the following statements :

1. The modern periodic table consists of ..... periods and the period number represents the number of .....
2. Pure water boils at ..... and freezes at .....
3. Most weather phenomena occur in ..... layer, while satellites swim through the .....
4. From the reasons of recent extinction are ..... and .....

B Mention one difference between :

1. Acidic oxide and basic oxide (dissolving in water).
2. Simple ecosystem and complicated ecosystem (example only).

C If the temperature at the sea level is 20.6°C. Find the temperature at the top of a mountain of height 2 km above Earth's surface.

Question 2

A Give reasons for :

1. Cobalt 60 is used in food preservation.
2. Petrified woods are considered as fossils although they look like rocks.
3. Elements of the same group have similar properties.

B What happens when ... ?

1. The overuse of freon.
2. Adding dil. HCl to a piece of carbon.
3. Decrease of water temperature less than 4°C.

C Mention the importance of :

1. Van-Allen belts.
2. Altimeter.

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الصف الثانى الاعدادى موقع ذاكرولى التعليمى كتاب المعاصر

Part 3

Question 3

A Choose the correct answer :

1. The scientist who discovered the main energy levels is .....
   a. Mendeleev. b. Bohr. c. Rutherford.
2. Complete body fossils of insects are found preserved in .....
   a. amber. b. snow. c. ocean.
3. All of the following gases are greenhouse gases except .....
   a. CO_2 b. O_2 c. CH_4
4. The density of ice is ..... the density of water.
   a. less than b. more than c. equal to
5. ..... is considered from halogens.
   a. Sodium b. Chlorine c. Helium
6. The normal atmospheric pressure at the sea level equals ..... millibar.
   a. 1013.25 b. 76 c. 1.013

B Write the chemical equations which represent the following reactions :

1. Reaction of sodium with water.
2. Reaction between chlorine gas and potassium bromide.
3. Carbon dioxide with water.

C Calculate the atomic number of :

1. Element (X) is located in the 3rd period and group (2A).
2. Element (Y) is located in the 1st period and group (1A).

Question 4

A Write the scientific term :

1. Elements have the properties of metals and nonmetals.
2. A charged layer reflects radio waves.
3. A bond that exists between water molecules.
4. A unit used for measuring ozone degree.
5. An apparatus used in electrolysis of water.
6. Safe areas established to protect endangered species.

B Correct the underlined words :

1. **Fluorine** is the only liquid halogen.
2. **Chemical** pollution of water causes many diseases as typhoid and hepatitis.
3. Meteors burn in **stratosphere**.
4. Archaeopteryx links between reptiles and **mammals**.
5. **Sodium chloride** is from polar compounds.

C Locate the position of the following elements in the modern periodic table :

1. $_{10}Ne$ 2. $_{19}K$ 3. $_{16}S$

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كتاب المعاصر موقع ذاكرولى التعليمى الصف الثانى الاعدادى

25 Qena Governorate — Educational Zone

Answer the following questions :

Question 1

A Complete the following statements :

1. In the modern periodic table, the elements are arranged according to ..... and .....
2. The strongest metallic element is found in group .....
3. The thickness of mesosphere layer is about ..... km.
4. ..... and ..... are considered from ozone layer pollutants.
5. The normal atmospheric pressure at the sea level equals ..... mb.
6. Fossils always exist in the ..... rocks.

B Write a definition for the following :

1. Extinction.
2. Electronegativity.
3. Atmospheric pressure.

Question 2

A Choose the correct answer :

1. Which of the following fossils play an important role in petroleum exploration ? .....
   a. Foraminifera and radiolaria. b. Nummulites and ammonites.
   c. Foraminifera and trilobite.
2. The ..... is/are used in preservation of agricultural crops.
   a. methyl bromide gas b. halons c. nitrogen oxide
3. The coldest atmospheric layer is .....
   a. troposphere. b. thermosphere. c. mesosphere.
4. The elements of group (7A) are known as .....
   a. alkali metals. b. halogens. c. alkaline earth metals.
5. There is ..... bonds between water molecules.
   a. ionic b. hydrogen c. covalent
6. Metal oxides are ..... oxides.
   a. acidic b. basic c. amphoteric
7. Which of the following fossils indicates that the environment, where they lived was clear warm and shallow seas ? .....
   a. Nummulites fossils. b. Ferns fossils. c. Coral fossils.

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الصف الثانى الاعدادى موقع ذاكرولى التعليمى كتاب المعاصر

Part 3

B Give a reason for :

1. Occurrence of extinction in the recent ages.
2. Sodium is kept under the surface of kerosene.

Question 3

A Write the scientific term :

1. The horizontal rows in the modern periodic table.
2. The radioactive element which is used in food preservation.
3. The decrease in the thickness of ozone layer.
4. The separating region between troposphere and stratosphere.
5. The gas which is collected at the cathode in water electrolysis.
6. The semi-conductor element which is used in electronics industry.

B Locate the position of the following elements in the modern periodic table :

1. $_{20}Ca$ 2. $_{17}Cl$ 3. $_{5}B$ 4. $_{18}Ar$

Question 4

A Put (✓) or (✗) in front of the following :

1. The air moves vertically in the bottom part of the stratosphere. ( )
2. Alkali metals locate in group (2A). ( )
3. Ice crystals have pentagonal shapes. ( )
4. In the period as the atomic number increases, the atomic size increases. ( )
5. The index fossil indicates the age of the sedimentary rocks. ( )
6. The simple ecosystem affected strongly by the absence of one species from its members . ( )

B Compare between :

The stratosphere layer and the mesosphere layer (in view of pressure and temperature).

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2
PART

30 Final Exams of some Schools Governorates

2018



* Some exams questions have been modified according to the ministry modifications for the first term 2017 - 2018

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PART 2

1 Cairo Governorate

New Cairo Educational Zone
Manor House School

Answer the following questions :

Question 1

A Complete the following :

1. ..... is an example for metalloids.
2. ..... is from the recent extinct animals.
3. ..... are curved lines that join parts of equal atmospheric pressure.

B Write the scientific term :

1. The nonmetal element which is used in preservation of eye cornea.
2. The hottest layer in the atmospheric air.

C What is the thickness of troposphere layer ? if the temperature at sea level is 24.5° C Find the temperature at the highest point.

Question 2

A Choose the correct answer :

1. The atmospheric pressure is measured in ..... unit.
   a. millibar b. Dobson c. nanometer
2. Meteors are formed in .....
   a. mesosphere. b. stratosphere. c. troposphere.

B Give reasons for :

The atomic size of elements in the same period decreases as their atomic number increases.

C Correct the underlined words :

1. Ozone gas is found in **troposphere** layer.
2. Quagga is from **endangered** species.
3. Inert gases are **active** gases.

Question 3

A What is meant by ... ?

1. Polar compounds. 2. Water pollution. 3. Protectorates.

B Compare between :

• Troposphere and stratosphere layers.

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الصف الثانى الاعدادى موقع ذاكرولى التعليمى كتاب المعاصر

C Complete the following equations :

1. $Mg + 2HCl(dil.) \longrightarrow$ ..... + ...
2. $Br_2 + 2KI \longrightarrow$ ..... + ...
3. $MgO + H_2O \longrightarrow$ .....

Question 4

A What happens when ... ?

1. The ratio of mercury increases in water.
2. Hydrogen molecule combines with oxygen atom.

B What are the uses of ... ?

1. Sodium in liquid state.
2. Aneroid.
3. Cobalt 60

C Write the scientific term :

1. A series in which metals are arranged in a descending order according to their chemical activity.
2. The apparatus which is used in water electrolysis.
3. A charged layer reflects radio waves.

2 Cairo Governorate — El Nozha Educational Administration, St. Fatima Lang. School

Answer the following questions :

Question 1

A Choose the correct answer :

1. The scientist ..... had discovered the main energy levels.
   a. Moseley b. Bohr c. Hofmann d. Moustafa
2. The modern periodic table consists of ..... horizontal periods.
   a. 7 b. 10 c. 14 d. 18
3. Atmospheric pressure is the ..... of air column of an atmospheric height on a unit area.
   a. mass b. volume c. weight d. density
4. Ozone layer is found in ..... layer.
   a. troposphere b. stratosphere c. mesosphere d. thermosphere
5. ..... is an example of microfossils.
   a. Mammoth b. Ferns c. Foraminifera d. Archaeopteryx

B Give reasons for :

1. Sodium is kept under the surface of kerosene.
2. Liquefied nitrogen is used in preservation of cornea of the eye.
3. The continuity of ozone layer erosion.

C What is meant by greenhouse gases ?

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PART 2

Question 2

A Put (✓) or (✗) and correct the wrong ones :

1. The elements with the same physical and chemical properties have been put in horizontal periods. ( )
2. Each period ends with a nonmetal. ( )
3. Papyrus is considered an extinct plant. ( )
4. Ultraviolet radiation splits the ozone molecule into two atoms. ( )
5. Mesosphere is the coldest layer in the atmospheric envelope. ( )

B Compare between the following :

- Mesosphere and thermosphere layers in term of (temperature and air pressure).

C What happens when ... ?

Putting red and blue litmus papers in pure water.

Question 3

A Write the scientific term :

1. Elements which start to appear in fourth period.
2. They are indicated by the letters K, L, M, N, O, P and Q.
3. Elements which have the properties of metals and nonmetals.
4. A kind of rays that causes harmful effects to human.
5. Remains of old organisms that lived in the past for a certain period and then became extinct.

B Mention one difference between of the following :

1. Fluorine molecule and helium molecule.
2. Trace and remains.

C 1. Mention the negative effects of global warming phenomenon.

2. How do we keep water from pollution ?

Question 4

A Complete the following statements :

1. Sodium oxide is from ..... oxides.
2. ..... and ..... are examples of polar compounds.
3. ..... radiation is characterized by a great heat effect.
4. Ozone layer contains a suitable amount of ..... gas.

B Show the electronic configuration of : $_{17}Cl$ and determine its location in the periodic table.

C Write the chemical equations :

1. Reaction of bromine with potassium.
2. Reaction of sodium with water.
3. Formation of ozone gas.

D Give a reason for : The boiling point of water is high.

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كتاب المعاصر موقع ذاكرولى التعليمى الصف الثانى الاعدادى

Workbook
Final Exams

3 Cairo Governorate — Heliopolis Educational Admin. St. Joseph's School

Answer the following questions :

Question 1

A Choose the correct answer :

1. The number of electrons in the outermost energy level in $_{20}Ca$ is .....
   a. 1 b. 2 c. 3 d. 4
2. The number of period in $_{10}Ne$ atom is .....
   a. 1 b. 2 c. 3 d. 4

B Give reason for each of the following :

1. The simple ecosystem is severely affected by the absence of one type of species.
2. Halogens exist in chemical compounds and not individually in nature.

Question 2

A Write the scientific term :

1. Elements that have both properties of metals and nonmetals.
2. A pollution originated from mixing of animals and human wastes with water.

B What happens when ... ?

- The concentration of greenhouse gases increases in the atmosphere.

Question 3

A Correct the underlined words :

1. The distribution of the charged ions extends 700 kms above the sea level is known as the **troposphere**.
2. Basic oxides dissolve in water forming **acids**.

B Write the proper group and period in the periodic table for each of the following :

1. $_{19}K$ 2. $_{3}Li$ 3. $_{11}Na$ 4. $_{13}Al$

C Define each of the following :

1. Petrification.
2. Electronegativity.

Question 4

A Why is the radioactive Cobalt 60 used in food preservation ?

B Complete the following symbolic equations :

1. ..... + $2HCl(dil.) \longrightarrow MgCl_2$ + ...
2. ..... + $2KI \longrightarrow 2KBr$ + ...

C Explain each of the following :

1. The Mammoth fossil was found to be completely preserved.
2. The density of water in its solid state is lower than in its liquid state.

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PART 2

4 Cairo Governorate

Heliopolis Educational Zone
St. Clare's College

Answer the following questions :

Question 1

A Complete the following sentences :

1. Mendeleev arranged the elements according to ..... , while Moseley arranged the elements according to .....
2. There are ..... bonds between water molecules.
3. During the formation of ozone layer, oxygen molecule absorbs ..... , which breaks the bond between the two atoms.
4. Nonmetal oxide dissolves in water giving ..... , which turns litmus paper into .....
5. The highest temperature layer in the atmosphere is ..... and the least temperature one is .....

B What is the importance of ... ?

1. Hofmann's voltameter.
2. Van-Allen belts.
3. Altimeter.

C Two elements $^{35}_{17}Y$ and $^{39}_{19}X$, find :

1. The electronic configuration.
2. The group number.
3. The period number.

Question 2

A Write the scientific term :

1. Gradual decrease in the number of living organisms without compensation until all die out.
2. A liquid metal acts as a heat conductor in nuclear reactors for generating electricity.
3. The traces and remains of old living organisms which are preserved in the sedimentary rocks.
4. The ability of covalent molecule to attract electrons in chemical bond.
5. The elements that have both properties of metals and nonmetals.
6. A phenomenon due to increase the percentage of CO_2 gas and leads to increase the temperature of atmosphere.

B Give reasons for :

1. Sodium and potassium should be kept under kerosene.
2. Pilots prefer to fly their planes at the lower part of stratosphere layer.
3. The elements of the same group have similar properties.
4. Pure water doesn't affect litmus paper.

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كتاب المعاصر موقع ذاكرولى التعليمى الصف الثانى الاعدادى

C What happens if ... ?

1. Dissolving magnesium oxide in water (write the equation).
2. Increasing the ratio of nitrogen oxide in the atmosphere.
3. Drinking water polluted with mercury.

Question 3

A Choose the correct answer :

1. All of the following metals react with water except .....
   a. potassium. b. copper. c. sodium. d. magnesium.
2. The unit of measuring atmospheric pressure is .....
   a. Dobson. b. bar. c. centimeter. d. kilogram.
3. Meteors are found in .....
   a. mesosphere. b. ionosphere. c. exosphere. d. stratosphere.
4. All of the following elements are Halogens except .....
   a. fluorine. b. nitrogen. c. bromine. d. chlorine.

B What is meant by ... ?

1. Atmospheric pressure.
2. Polar compounds.

C Mention one example of :

1. Greenhouse gases.
2. Basic oxides.
3. The strongest metallic element in group (1A).

Question 4

A Correct the underlined words :

1. Each period ends with a **nonmetal**.
2. **Chemical** pollution of water causes many diseases as typhoid and hepatitis.
3. Infrared radiation has a **chemical** effect.
4. Panda bear is considered from **extinct species**.
5. Ozone layer is measured in a unit called **nanometer**.

B Put (✓) or (✗) and correct the wrong statements :

1. Ozone molecule consists of three hydrogen atoms. ( )
2. Halogens are monovalent metals. ( )
3. The density of air increases as we go up. ( )

C Compare between :

1. The metallic property in the group and in the period.
2. Simple ecosystem and complicated ecosystem. (definition only)

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كتاب المعاصر موقع ذاكرولى التعليمى الصف الثانى الاعدادى

PART 2

5 Cairo Governorate

Abdeen Educational Directorate
Virtue and Science

Answer the following questions :

Question 1

A Complete :

1. Ionosphere is surrounded by two magnetic belts known as ..... belts that play an important role in .....
2. Among the pollutants of ozone layer are ..... compounds that are used in air conditioning sets and ..... compounds that are used in fire extinguishers.
3. ..... is an alkali metal which lies in period three and its atomic number is .....
4. The thickness of ozone layer is about ..... mm or equals ..... Dobson under STP.
5. Halogen molecules are ..... molecules as their molecules consist of ..... atoms.

B State using equations :

1. How to obtain Br_2 from KBr.
2. The role of UV radiation in ozone formation.

C Explain :

1. Hydrogen bond is responsible for the abnormal properties of water.
2. Importance of fossils in life evolution.

Question 2

A Give reasons for :

1. Amber is considered a suitable medium for the formation of complete bodies' fossils.
2. Troposphere layer regulates the Earth's temperature.
3. Elements of the same group have similar properties.

B Choose the correct answer :

1. The number of negative electrons in the atom in its normal state equals .....
   a. the number of protons. b. the number of neutrons.
   c. twice the number of protons. d. half the number of neutrons.
2. Greenhouse effect explains .....
   a. erosion of the ozone layer. b. global warming.
   c. a new way of agriculture. d. water evaporation.
3. When sodium reacts with water, ... gas evolves.
   a. O_2 b. CO_2 c. H_2 d. N_2

C What does this number indicate 16 km ?

هذا العمل خاص بموقع ذاكرولى التعليمى ولا يسمح بتداوله على مواقع أخرى
الصف الثانى الاعدادى موقع ذاكرولى التعليمى كتاب المعاصر

Question 3

A Write the scientific term :

1. A phenomenon that appears as brightly colored light curtains seen from both the poles of the Earth.
2. Different forms of nuclei of the same element having the same atomic number but different in the atomic weights.
3. A kind of rays with wavelength 280 : 315 nm.

B Compare between :

1. The simple ecosystem and the complicated ecosystem.
2. Dodo bird and ibis bird.
3. Magnesium oxide and sulphur oxide.

C Awareness about the importance of protecting natural life increased after great harmful consequences that have appeared since the mid 20^{th} century. Explain three ways to protect the endangered species.

Question 4

A Correct without changing the underlined phrases :

1. By increasing the atomic number within a period the **metallic property increases**.
2. Liquefied nitrogen is used in **food preservation**.

B Mention one example for :

1. A petrified fossil.
2. A natural protectorate found in South Sinai in Egypt.
3. An alkali metal that is kept under the surface of paraffin oil only.

C What happens when ... ?

1. Adding the purple sunflower solution to a jar has a piece of burning coal.
2. Dissolving potassium in water.
3. The pollution of water with animals and human wastes.

6 Cairo Governorate

El Maadi Educational Department
Manarat El Maadi Language School

Answer the following questions :

Question 1

A Write the scientific term :

1. The weak electrostatic attraction between water molecules.
2. The ability of the atom in covalent molecule to attract the chemical bond electrons to it.
3. The vertical column in Mendeleev's table.
4. The traces and remains of old living organisms which are preserved in sedimentary rocks.
5. The hottest atmospheric layer.
6. A unit used for measuring ozone degree.

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الصف الثانى الاعدادى موقع ذاكرولى التعليمى كتاب المعاصر

PART 2

B Give an example for :

1. A metalloid.
2. An acidic oxide.
3. A substance has bad effect on ozone layer.
4. A water pollutant causes damage of brain cells.

Question 2

A Choose :

1. The transitional elements start to appear from period .....
   a. 2 b. 3 c. 4 d. 5
2. Electronic configuration of the ions of all the following is similar to that of $_{18}Ar$ except .....
   a. $_{15}P$ b. $_{16}S$ c. $_{11}Na$ d. $_{17}Cl$
3. Water has ..... effect on litmus paper.
   a. basic b. acidic c. neutral d. alkaline
4. The ozone layer found in ..... layer.
   a. troposphere b. stratosphere c. mesosphere d. thermosphere

B Write the balanced chemical equation for the following :

1. Reaction of sodium with water.
2. Reaction of magnesium with dilute hydrochloric acid.
3. Reaction of carbon dioxide with water.
4. Two steps of ozone formation from oxygen by UV.

Question 3

A Write the importance of :

1. Halons.
2. Liquid nitrogen.
3. Overuse of freon.
4. Altimeter.

B Study the opposite figure which represents a section of the periodic table, then answer :

What is the symbols which indicate the :

1. Inert gases.
2. Alkali metals.
3. Halogens.

A																N	
	C												I	K		L	
B				D			E		F		G	H	J			M	O

Question 4

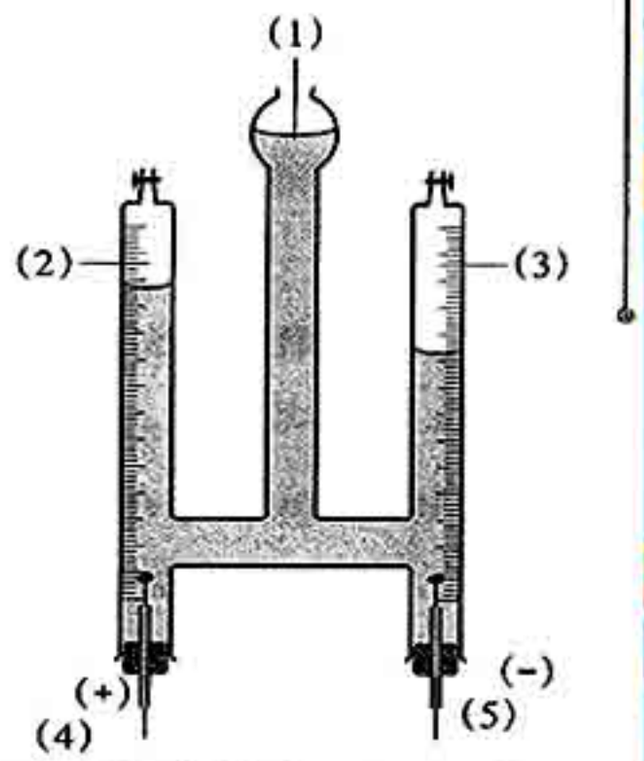
A Locate the position of the following elements in the modern periodic table :

1. $_{13}Al$
2. $_{8}O$
3. $_{10}Ne$
4. $_{20}Ca$

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B From the opposite figure, answer the following questions :

1. What is the name of this apparatus ?
2. Label the numbers (1) , (2) , (3) , (4) and (5) ?
3. Calculate the volume of the gas that evolves at the positive pole if the volume of the gas at the negative pole is 20 cm^3.



7 Cairo Governorate

Shoubra Educational Zone
Good Shepherd School El-Attar

Answer the following questions :

Question 1

A Choose the correct answer :

1. Meteors burn in .....
   a. mesosphere. b. ionosphere. c. stratosphere.
2. The number of groups in p-block is .....
   a. 5 b. 6 c. 7
3. ..... is located between stratosphere and mesosphere.
   a. Tropopause b. Stratopause c. Mesopause
4. An example of complete body fossil is .....
   a. mammoth. b. cast. c. mold.

B Correct the underlined words :

1. The polar compound is **an ionic** compound, the electronegativity difference between its elements is relatively high.
2. Panda bear is an example of **extinct** species.
3. Ultraviolet radiation has a **thermal** effect.
4. The **mold** is a copy of external shape of the shell.

C Write the balanced chemical equations which express the following :

1. Reaction of carbon dioxide with water.
2. Reaction of chlorine with potassium bromide.

Question 2

A Complete the following statements :

1. ..... and ..... are microfossils used in petroleum exploration.
2. The ecosystem is classified according to degree of effect into ..... and .....

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PART 2

3. From advantages of Mandeleev table are ..... and .....
4. Group (7A) is called ....., while group zero is called .....
5. Among pollutants of ozone layer are ..... compounds used in air conditioning sets and ..... compounds used in fire extinguishers.

B Mention one use for each of the following :

1. Cobalt 60.
2. Ionosphere.

C Mention one example of :

1. Greenhouse gases.
2. Endangered animals.

Question 3

A Write the suitable scientific term :

1. A metal doesn't react with water.
2. A protectorate characterized by presence of coral reefs and colored fish.
3. The weight of air column of an atmosphere height on a unit area.
4. A phenomenon appears as brightly colored light curtains at both poles of the Earth.
5. Fossils of organisms that lived in a short period of time in the past and become extinct.
6. A compound has a neutral effect on litmus paper.

B Compare between :

- Biological and chemical water pollution.

Question 4

A Give reasons for :

1. Elements of group (1A) are called alkali metals.
2. Formation of ozone layer in the stratosphere.
3. Bald eagle is called by this name.

B Problem : Calculate the temperature at the top of a mountain if the temperature at sea level is 10°C and its height is 10 km.

C Locate the position of the following elements in the modern periodic table :

1. $_{11}Na$
2. $_{1}H$
3. $_{10}Ne$

8 Giza Governorate — El-Sadat Language School

Answer the following questions :

Question 1

A Complete :

1. The type of bond in the water molecule is ..... , while the bond between water molecules is .....

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2. From greenhouse gases are ..... and .....
3. $Cl_2 + 2KBr \longrightarrow$ ..... + ...
4. Carbon dioxide gas is ..... oxide, while magnesium oxide is ..... oxide.
5. Fossils are used in ..... exploration and determining the age of .....

B Locate the position and type of the following elements in the modern periodic table :

1. $_2He$ 2. $_{17}Cl$ 3. $_{11}Na$ 4. $_{20}Ca$

Question 2

A Write the scientific term of the following :

1. A layer of atmosphere in which satellites float.
2. The gas evolved at the cathode of Hufmann's voltameter.
3. They are natural safe areas to protect the endangered species.
4. A bright coloured light curtains are seen at two poles of Earth.

B Give reasons for :

1. Limestone rocks of El-Mokattam's mountain contain nummulites fossils.
2. Sodium and potassium are kept under kerosene surface.
3. The lower part of stratosphere layer is suitable for flying planes.
4. Liquefied nitrogen is used in preservation of cornea.

Question 3

A Calculate the height of a mountain if the temperature at its base is 25°C and at its top is (–14)°C.

B Choose the correct answer :

1. An example of microfossils is .....
   a. mammoth. b. fern. c. radiolaria. d. archaeopteryx.
2. The largest atomic size in these elements has atomic number .....
   a. 7 b. 11 c. 9 d. 17
3. All of the following are extinct species except .....
   a. dodo bird. b. bald eagle. c. quagga. d. dinosaur.
4. The coldest layer is ..... layer.
   a. exosphere b. troposphere c. stratosphere d. mesosphere

C Mention the importance of :

1. Van-Allen belts. 2. Cobalt 60.

Question 4

A Show by the symbolic equations only how is the ozone gas formed ?

B What is meant by ... ?

1. Global warming. 2. Fossils. 3. Metalloids.

C Compare between simple ecosystem and complicated ecosystem. (two points).

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الصف الثانى الاعدادى موقع ذاكرولى التعليمى كتاب المعاصر

PART 2

9 Giza Governorate

Experimental Directorate
Dr.Ahmed Zewail G.L.S

Answer the following questions :

Question 1

A Complete the following statements :

1. The hottest layer in the atmosphere is ....., while the coldest layer is .....
2. From greenhouse gases are ..... and .....
3. Archaeopteryx is a fossil that links between ..... and .....
4. Ultraviolet rays have ..... effect, while infrared rays have ..... effect.

B What is meant by ... ?

1. Electronegativity.
2. Fossils.

Question 2

A Choose the correct answer :

1. All of the following are endangered species except .....
   a. panda bear. b. bald eagle. c. quagga. d. rhinoceros.
2. The normal atmospheric pressure at the sea level equals ..... mb.
   a. 76 b. 1013.25 c. 1.013 d. 760
3. Luminous meteors are formed in ..... layer.
   a. ionosphere b. stratosphere c. exosphere d. mesosphere
4. Complete body fossils of insects are found preserved in .....
   a. amber. b. snow.
   c. sedimentary rocks. d. ocean.

B Mention the function of :

1. Altimeter.
2. Hofmann's voltameter.
3. Cobalt 60.
4. Natural protectorate.

C Compare between :

1. Simple ecosystem and complicated ecosystem.
2. Basic oxide and acidic oxide.

Question 3

A Give reason for each of the following :

1. The lower part of stratosphere is a suitable for flying aeroplanes.
2. Elements of the same group have the same properties.
3. Group (1A) is called alkali metals.

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كتاب المعاصر
موقع ذاكرولى التعليمى
الصف الثانى الاعدادى

B Mention the name of the scientist who :

1. Discovered that the atom has 7 energy levels.
2. Discovered that the nucleus has positive charges called protons.
3. Postulated that the thickness of ozone layer is 3 mm at STP.

C Write the balanced chemical equation which expresses the following reactions :

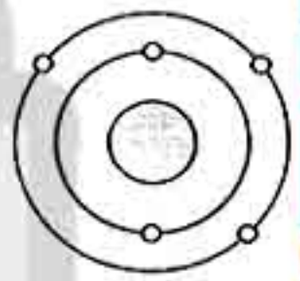
1. Putting a piece of sodium in water.
2. Burning magnesium ribbon in air.
3. Passing chlorine gas in potassium bromide solution.

Question 4

A Write the scientific term :

1. Phenomenon that appear as a bright colours at the two poles.
2. The death of all members of species of living organisms.
3. Oxides that cause ozone hole and result from burning of fuel of concorde planes.
4. Thinning or losing parts of ozone layer.
5. Any change in the water properties that harm the human health or life.

B Study the opposite figure which explains the electronic configuration for an element in the modern periodic table. Calculate the atomic number of the element which follows this element in :



1. The same period.
2. The same group.

C Problem : Calculate the temperature at the top of a mountain if its height is 4 km and the temperature at its foot is 30°C.

10 Giza Governorate

Beu-lake Directorate
Dar El-Hanan L.S.

Answer the following questions :

Question 1

A Complete the following statements :

1. The scientist ..... discovered the main energy levels around the nucleus, while the scientist ..... discovered the positive protons inside the nucleus.
2. The coldest layer in atmosphere is ..... but the hottest layer is .....
3. Archaeopteryx represents the link between ..... and .....

B What is meant by ... ?

1. Chemical activity series.
2. Index fossil.

C Problem : Find the temperature at the top of a mountain, its height is 3 km if the temperature at sea level is 20°C.

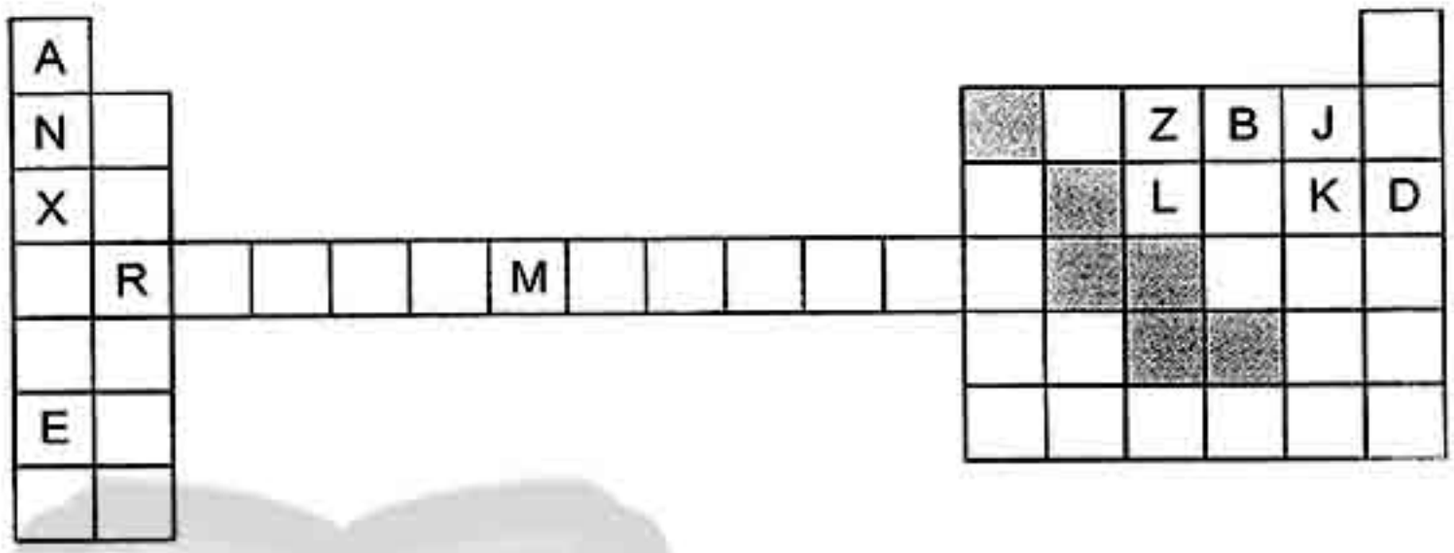
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كتاب المعاصر موقع ذاكرولى التعليمى الصف الثانى الاعدادى

PART 2

Question 2

A The opposite figure represents a part of the modern periodic table :



1. What is the kind of (X - M - D) elements ?
2. What is the atomic no. of (B) element ?
3. What is the shaded area represent ?
4. Indicate :
   a. The most active metal.
   b. The largest size element in second period.

B Give one example for :

1. A trace.
2. An ozone pollutant.
3. An extinct bird.
4. A greenhouse gas.

Question 3

A Give reasons for :

1. Liquefied nitrogen used in preserving eye cornea.
2. Rain, clouds and wind happen in troposphere.
3. Stop production of concorde (ultrasonic) planes.

B Compare between :

1. Mesosphere layer and stratosphere layer (in view of temperature and importance).
2. Simple ecosystem and complicated ecosystem.

Question 4

A Write the scientific term for the following statements :

1. The ability of the atom to attract the bond electrons to itself in the covalent compound.
2. An atmospheric layer in which the atmosphere is inserted into the outer space.
3. Replacing part by part the original wooden material by silica.
4. Safe places which protect the endangered species in their homeland.

B Write the chemical equation that indicates the following :

Reaction between magnesium with oxygen gas.

C Mention one importance for :

1. The two Van-Allen belts.
2. Fossils.

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11 Giza Governorate

El-Haram Educational Zone
Sakkara Language School

Answer the following questions :

Question 1

Complete the following :

1. Each period in the modern periodic table starts with ..... and ends with .....
2. ..... and ..... are from the extinct animals in the old ages.
3. Elements of group (1A) are called ..... metals.
4. Ultraviolet radiations have ..... effect, while infrared radiations have ..... effect.
5. Archaeopteryx represents the link between ..... and .....

Question 2

A Write the scientific term :

1. The ability of the atom in the covalent molecule to attract the electrons of the chemical bond towards itself.
2. Two magnetic belts help in dispersing the harmful cosmic radiations away from the Earth.
3. Fossils of living organisms lived for a short period of time and in a wide geographical range and then became extinct.
4. The death of all members of a certain species of living organisms.
5. The block in the modern periodic table which contains series of lanthanides and actinides.
6. A layer of the atmospheric envelope in which the air moves vertically.

B Mention one difference between :

1. Mendeleev's periodic table and Moseley's periodic table.
2. Mesosphere and thermosphere.

Question 3

A Choose the correct answer :

1. The elements which occupy the middle block of the modern periodic table are called ..... elements.
   a. alkaline b. inert c. halogen d. transition
2. There are ..... bonds among the water molecules.
   a. ionic b. covalent c. hydrogen d. metallic
3. The scientist who discovered the main energy levels is .....
   a. Rutherford. b. Moseley. c. Bohr. d. Mendeleev.
4. All of the following are greenhouse gases except .....
   a. CO_2 b. O_2 c. N_2O d. CH_4

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PART 2

5. Fossils are found in ..... rocks.
   a. igneous b. volcanic c. sedimentary d. metamorphic
6. All of the following are endangered species except .....
   a. panda bear. b. bald eagle. c. quagga. d. rhinoceros.
7. The height of the mountain where the temperature at its foot is 30°C and at its top is –9°C is ..... km.
   a. 6 b. 7 c. 8 d. 9

B Mention one importance for :

1. Liquefied nitrogen. 2. Altimeter. 3. Coral fossil.

Question 4

A Give reasons for :

1. Cesium is considered as the strongest metallic element.
2. Cobalt 60 is used in preservation of food.
3. Water has high boiling point.
4. Barium oxide is considered as a basic oxide.
5. The lower part of the stratosphere layer is suitable for flying airplanes.

B Mention one example for :

1. Microfossils. 2. Halogens.

C Locate the position of the following elements in the modern periodic table :

1. $_{17}Cl$ 2. $_{20}Ca$

12 Giza Governorate

6 of October Directorate
Smart Vision Language School

Answer the following questions :

Question 1

A Complete :

1. From energy sublevels are s, p, d and .....
2. Elements of "d" block are called ..... elements.
3. Water has ..... effect on litmus solution.
4. From greenhouse gases are ..... and .....
5. Bluestone protectorate preserves ..... animal.
6. Alkali metals are located in group ..... but inert gases are located in group ..... in the modern periodic table.

B Calculate the temperature at the Earth's surface if the temperature at a height 2 km is 13°C.

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Question 2

A Choose :

1. From gaseous elements in group (7A) is .....
   a. chlorine. b. iodine. c. fluorine. d. (a and c) together.
2. When water freezes, its density .....
   a. increases. b. decreases. c. doesn't change. d. risesup.
3. From types of fossils is are .....
   a. petrified fossils. b. mold. c. cast. d. all of them.
4. From complete body fossils is .....
   a. dinosaur. b. radiolaria. c. mammoth. d. worm.
5. If hydrogen volume in water electrolysis is 20 cm^3, so oxygen volume will be .....
   a. 5 cm^3 b. 10 cm^3 c. 20 cm^3 d. 40 cm^3
6. Halogens are called by this name because they react with ..... forming salts.
   a. acids b. bases c. water d. metals

B Mention one use for :

1. Liquefied nitrogen. 2. Aneroid.

Question 3

A Mention the scientific term :

1. Continuous increase of the average temperature of the air near the surface of the Earth.
2. An animal is considered midway between horse and zebra.
3. A type of ultraviolet radiations that is absorbed mostly (95%) in the ozone layer.
4. Fossils of organisms lived in the past for a short time then extinct.
5. Safe places established to protect endangered species in their natural environment.
6. The scientist who discovered that the nucleus of atom contains positive protons.
7. The ability of atom in covalent molecule to attract the bond electrons to it.
8. The death of all members of certain species of living organisms.

B Locate the position of $_{19}K$ in the modern periodic table.

Question 4

A Correct the underlined words :

1. There are **covalent** bonds between water molecules.
2. From endangered birds is **quagga**.
3. Fossils are preserved in **igneous** rocks.
4. Date of death of last individual of species is called **fossils**.
5. From non-polar compounds is **ammonia**.
6. The unit of measuring atomic radius is **Dobson unit**.

B Give reasons for :

1. Pilots prefer to fly at the lower part of stratosphere.
2. Dodo bird is an easy target for hunters.

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الصف الثانى الاعدادى موقع ذاكرولى التعليمى كتاب المعاصر

PART 2

13 Alexandria Governorate — Franciscan Sisters School Ibrahimieh

Answer the following questions :

Question 1

A Write the scientific term :

1. The death of all members of species.
2. Elements that have both properties of metals and nonmetals.
3. The weight of air column of an atmosphere height on a unit area (1 cm^2 or 1 m^2).

B Mention one difference between each of the following :

1. Simple ecosystem and complicated ecosystem.
2. Stratosphere layer and mesosphere layer.

C Choose the correct answer :

1. The remains and traces of old living organisms preserved in sedimentary rocks is/are .....
   a. extinction. b. the red list. c. fossils. d. solidification.
2. Metal oxides are ..... oxides.
   a. acidic b. basic c. amphoteric d. neutral
3. The charged cosmic radiations are dispersed in the ..... layer.
   a. troposphere b. stratosphere c. mesosphere d. thermosphere
4. Ozone gas is measured in a unit called .....
   a. km. b. Dobson. c. millibar. d. mm^3.

Question 2

A Write the symbolic chemical equations representing the following reactions :

1. Reaction of magnesium with oxygen then dissolution the product in water.
2. Reaction of chlorine with potassium bromide.
3. Dissolving carbon dioxide in water.

B Write the atomic number of the following elements :

1. Inert gas lies in the second period.
2. Halogen lies in the third period

C Find the temperature at the base of a mountain, if you know that the temperature at its top equals (–10°C) and its height equals (4 km).

Question 3

A What happens when ... ? And why ?

1. A piece of sodium is exposed to moist air.
2. Decreasing the water temperature less than 4°C.

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الصف الثانى الاعدادى
موقع ذاكرولى التعليمى
كتاب المعاصر

B On electrolysis of a certain volume of acidified water, if the volume of evolved gas above the anode was 2.5 cm^3 :

1. Calculate the volume of the evolved gas above the cathode.
2. What is the name of the gas that evolves above the anode and above the cathode ?
3. Mention the name of the apparatus which is used in this process.

C Put (✓) or (✗) and correct the mistakes :

1. The covalent bond becomes ionic when the difference in electronegativity between the bonded atoms = zero. ( )
2. All the atmospheric phenomena like rain, wind and clouds occur in the ionosphere. ( )
3. The elements with the same physical and chemical properties have been put in vertical columns. ( )

Question 4

A Give the scientific reasons for the following :

- Fossils have importance.

B Complete the following sentences :

1. Each period in the modern periodic table starts with ..... and ends with .....
2. Sodium is kept under the surface of ..... , so as not to react with .....
3. Satellites float in ..... layer, while pilots prefer to fly in the lower part of ..... layer.
4. Ultraviolet radiation has a ..... effect, while infrared radiation has a ..... effect.

C Mention an example for each of the following :

1. Endangered species.
2. A gaseous halogen.
3. A fluorochlorocarbon compound.

14 Alexandria Governorate — Saint Vincent De Paul School

Answer the following questions :

Question 1

A Choose the correct answer :

1. Mammoth fossil is an example of ..... fossils.
   a. cast b. mold c. petrified d. complete body
2. Lanthanides are located in ..... block.
   a. (s) b. (d) c. (f) d. (p)
3. Aluminium ($_{13}Al$) is located in .....
   a. period 3. b. period 2. c. period 7. d. period 5.

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كتاب المعاصر موقع ذاكرولى التعليمى الصف الثانى الاعدادى

PART 2

4. Adding drops of ..... to water during its electrolysis.
   a. nitric acid
   b. sulphuric acid
   c. hydrochloric acid
   c. no correct answer

B Give reasons for :

1. Melting of ice of south and north poles.
2. Ammonia is considered a polar covalent compound.
3. The atomic size of $_{11}Na$ is greater than $_{17}Cl$.
4. The lower part of stratosphere is suitable for flying aeroplanes.

C If the temperature at the foot of a mountain is 40°C. Calculate the temperature at its top if the height of the mountain is 3 km.

Question 2

A Complete the following :

1. Ozone degree is measured in a unit called .....
2. ..... is the weight of air column of an atmospheric height on a unit area.
3. A sticky matter secreted from the pine trees to form the fossil of .....
4. The scientist ..... had discovered the energy levels.

B Compare between :

1. Altimeter and aneroid.
2. Basic oxides and acidic oxides.

Question 3

A Write the scientific term :

1. Rays which are emitted from cobalt (60).
2. Elements have the symbol (B).
3. Two magnetic belts help in dispersing the harmful radiation away from the Earth.
4. Substitution of silica in place of wood without changing in the form.
5. Organic matter prevents alkali metals from reacting with moist air.

B Write the chemical equations which express the following :

1. Reaction of bromine with potassium iodide.
2. Electrolysis of water.
3. Reaction of magnesium with hydrochloric acid.

C Draw the bonds between the atoms and molecules in water.

Question 4

A What is meant by ... ?

1. Electronegativity.
2. Aurora phenomenon.
3. Metalloids.
4. Global warming phenomenon.

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B Correct the underlined words :

1. Each period ends by **a nonmetal element**.
2. Halogens are **monovalent metals**.
3. Normal atmospheric pressure equals 76 **millibar**.
4. The **halons** are produced from supersonic airplanes.

15 Alexandria Governorate

East Educational Zone
Sidi Gaber Language School

Answer the following questions :

Question 1

A Give a scientific term for each of the following statements :

1. Safe areas established to protect endangered species in their homeland.
2. Ability of an atom to attract the electrons of a chemical bond.
3. Arrangement of elements in a descending order according to their chemical activity.
4. An atmospheric layer that contains 75% of the mass of atmospheric air and in which all weather phenomena occur.
5. Traces and remains of old living organisms that are preserved in sedimentary rocks.
6. A block in the periodic table that contains groups from (3A) to (7A).
7. Elements having the properties of metals and nonmetals.

B What would happen if ... ?

1. Ionosphere wasn't surrounded by two magnetic belts.
2. Methyl bromide was overused as an insecticide.

Question 2

A Complete the following sentences :

1. In the modern periodic table, the strongest ..... lie in group (1A), while the strongest ..... lie in group (7A).
2. Liquefied nitrogen is used to preserve ..... , while liquid sodium is used in .....
3. Van-Allen belts cause the ..... phenomenon which takes place in the two poles of .....
4. In water molecules, there are two ..... bonds, the angle between them is .....
5. ..... and ..... are two gaseous halogens.
6. Archeopteryx represents the link between ..... and .....
7. ..... and ..... are from the most dangerous pollutants of ozone layer.

B Give reason for each of the following :

1. Pilots prefer flying in the stratosphere layer.
2. Water shouldn't be used to put off a sodium fire. (Give a balanced chemical equation)

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PART 2

Question 3

A Choose the correct answer :

1. An element $_{17}X$ is similar to .....
   a. $_{2}A$ b. $_{19}Z$ c. $_{9}L$ d. $_{7}Y$
2. ..... discovered that a nucleus contains positively charged protons.
   a. Mendeleev b. Einstein c. Rutherford d. Bohr
3. Meteors are formed in ..... layer.
   a. mesosphere b. ionosphere c. stratosphere d. exosphere
4. All of the following are endangered species except .....
   a. quagga. b. bald eagle. c. panda bear. d. ibis bird.
5. All of the following diseases are caused by biological pollution except .....
   a. bilharzia. b. typhoid. c. hepatitis. d. cancer.
6. All of the following are greenhouse gases except .....
   a. CH_4 b. N_2O c. O_2 d. CO_2
7. ..... is a natural protectorate characterized by the presence of rare coral reefs and coloured fish.
   a. Panda protectorate b. Ras Mohamed protectorate
   c. Bluestone protectorate d. Wadi Hetan protectorate

B Complete and balance the following equations :

1. $Mg + ... \xrightarrow{dil.} MgCl_2 + H_2\uparrow$ 2. $CO_2 + H_2O \longrightarrow .....$
3. $Br_2 + 2KI \longrightarrow ..... + ...$

Question 4

A Correct the underlined word(s) :

1. Ice crystals have **pentagonal** shape.
2. **Thermal** pollution originates from leakage of radioactive substances from nuclear reactors.
3. Water has a **basic** effect on litmus paper.
4. **Ferns** fossils indicate that they lived in clear, warm and shallow seas.

B Calculate the height of a mountain given that the temperature at its base = 40°C and at its top = –12°C.

C Give two negative effects for global warming phenomenon.

D Locate the position of the following elements in the modern periodic table :

1. $^{40}_{20}Ca$ 2. $^{27}_{13}Al$

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16 El-Kalyoubia Governorate — Science Inspectorate

Answer the following questions :

Question 1

A Complete the following sentences :

1. $2H_2O \xrightarrow{\text{Electrolysis}}$ ..... + ...
2. Lithium and sodium ..... on the surface of water as their densities are ..... than water density.
3. There are three types of ultraviolet rays, near ultraviolet rays, ... ultraviolet rays and ..... ultraviolet rays.
4. The atmospheric envelope height from sea level is ..... , while normal atmospheric pressure equals ..... millibar.
5. ..... + ... $\xrightarrow{\text{Dilute}} MgCl_2 + H_2$

B Locate the position of the following elements in the modern periodic table :

1. $_{13}Al$ 2. $_{10}Ne$ 3. $_{17}Cl$

C Compare between the following :

Simple ecosystem and complicated ecosystem and mention examples.

Question 2

A Write the scientific term for each of the following sentences :

1. The traces and remains of the old living organisms which are preserved in sedimentary rocks.
2. The elements that have the properties of metals and nonmetals.
3. They are two belts surround the atmosphere from outside and help in scattering the harmful cosmic radiations come from the Sun.
4. Safe places that are specified to protect the endangered species in their natural environment.

B Give reasons for :

1. Water and ammonia are polar compounds.
2. Cobalt 60 is used in food preservation.
3. Ionosphere layer is important for radio stations.

C If the temperature at the foot of Everest mountain is 22.6°C, find the temperature at its top of a height 8862 m. above the Earth's surface.

Question 3

A Choose the correct answer :

1. Ice crystals have ..... shape.
   a. hexagonal b. square c. pentagonal d. triangular

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PART 2

2. Each period in the modern periodic table starts with a/an .....
   a. semi-metallic element. b. nonmetallic element.
   c. inert gas. d. metallic element.
3. An example of microfossils is .....
   a. mammoth. b. ferns. c. foraminifera. d. archaeopteryx.
4. The important layer of the atmospheric envelope for man's life is called .....
   a. thermosphere. b. stratosphere. c. troposphere. d. mesosphere.

B What is the importance of the following ... ?

1. Liquefied nitrogen. 2. Altimeter.

C Put (✓) or (✗) and correct the wrong ones :

1. The main energy levels had discovered by Moseley. ( )
2. Water has an acidic effect on litmus paper. ( )
3. The most important greenhouse gases are CO_2, CH_4, N_2O, H_2O and CFCs. ( )
4. The measurement unit of the degree of ozone layer is bar. ( )

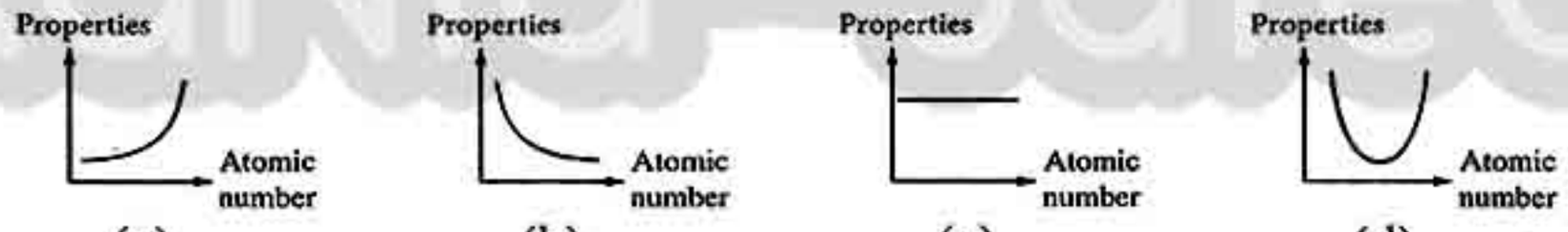
Question 4

A Correct the underlined words in the following statements :

1. **Dodo bird** is endangered animal.
2. Eating food containing high ratios of **arsenic** causes the death of brain cells.
3. **Bohr** arranged the elements ascendingly according to their atomic weights.
4. Meteors burn in **thermosphere** layer.
5. If the metal lost one electron or more, it will become **negative** ion.

B Which of the following figures represents :

• The relation between the nonmetallic property and atomic number of elements of group (7A).



C Define the following :

1. Extinction. 2. The isobar.

17 El-Menofia Governorate — Science Inspectorate

Answer the following questions :

Question 1

A Complete the following :

1. The new number of zero group is ....., while that of group (5A) is .....

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2. ..... is used in food preservation, because it emits ..... rays which prevent the production of microbical cells.
3. $Cl_2 + 2KBr \longrightarrow$ ..... + ...
4. The bond between oxygen atom and hydrogen atom in water molecule is ....., while bonds among water molecules are ..... bonds.
5. There is ..... fossils in the ..... rocks which form El-Mokattam's mountain.

B Calculate the atomic number of the following elements :

1. A metallic element, its valency is divalent and locates in the third period.
2. A noble gas locates in the third period.
3. An element is located in the 1st period and group (1A).

C Problem :

If the temperature at the top of a mountain is –5°C and at a point in its middle is 8°C, calculate the height of the mountain and the temperature at its base.

Question 2

A Choose the correct answer :

1. The number of elements which exist in nature is .....
   a. 99 b. 118 c. 24 d. 92
2. The elements which occupy the middle block (d) in the periodic table are called ..... elements.
   a. transition b. alkali c. alkaline Earth d. noble
3. If the sum of volumes of evolved gases at two poles of Hofmann's voltameter is 60 cm^3 so, the volume of oxygen gas and hydrogen gas is ..... respectively.
   a. 20 : 40 b. 40 : 20 c. 30 : 30 d. 15 : 45
4. The ..... layer is much vaccumed layer.
   a. troposphere b. stratosphere c. mesosphere d. thermosphere

B What is meant by ... ?

1. Atmospheric pressure. 2. Hydrogen bond. 3. Fossils.

C Choose the odd word out and write the scientific term for others :

1. Nitrogen oxides - Water vapour - Freon - Halons.
2. Quagga - Dodo bird - Dinosaur - Bald eagle.

Question 3

A Put (✓) or (✗), then correct the wrong ones :

1. Water has a neutral effect on litmus solution. ( )
2. Magnesium and potassium are kept under the surface of kerosene. ( )
3. Altimeter is an instrument used to determine the elevation of aeroplanes from sea level. ( )
4. The archaeopteryx fossil is a kind of extinct elephants. ( )
5. Papyrus is considered an extinct plant. ( )

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PART 2

B Give reasons for :

1. Elements of the same group have similar properties.
2. Barium oxide is considered a basic oxide.
3. Ionosphere is important for radio station.

C What is the importance of ... ?

1. Liquefied nitrogen.
2. Nummulite fossil.

Question 4

A Write the scientific term :

1. The halogen which exists in a solid state.
2. Two magnetic belts that help in scattering of harmful cosmic radiations away from the Earth.
3. Fossils of organisms that had lived for a short period of time in the past and had a wide geographic distribution.
4. The path which the energy takes when it is transported from a living organism to another one inside the environmental system.

B Compare between :

Group (1A) and group (7A) related to [name - valency - kind of formed ions].

C Mention an example for each of the following :

1. A trace fossil.
2. A non-polar compound.

18 El-Dakahlia Governorate — Educational Directorate

Answer the following questions :

Question 1

A Choose the correct answer :

1. Meteors are formed in .....
   a. thermosphere. b. mesosphere. c. stratosphere. d. exosphere.
2. Which of the following belongs to the same group in the periodic table .....
   a. Na, Li b. Na, Cu c. Na, Ne d. Na, C
3. The ozone is measured in a unit called .....
   a. km b. °C c. Dobson d. millibar
4. Each period in the modern periodic table starts with ..... element.
   a. semi-metallic b. inert c. nonmetallic d. metallic
5. All of the following are greenhouse gases except .....
   a. O_2 b. CO_2 c. N_2O d. CH_4

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B Complete the following sentences :

1. The nanometer equals ..... meter.
2. The ozone layer doesn't allow the passage of ..... ultraviolet rays.
3. ..... is non-flying and an extinct bird.
4. ..... predicated the ability of discovering new elements, so he left spaces in his table.

Question 2

A Put (✓) or (✗) for each of the following statements :

1. There are fossils of complete insects kept in amber. ( )
2. Sufficiency of plants on the Earth leads to the increase in temperature. ( )
3. The troposphere layer is the suitable layer for flying planes. ( )
4. The angle between covalent bonds in water molecule is 100°. ( )

B Write the balanced chemical equations for each of the following :

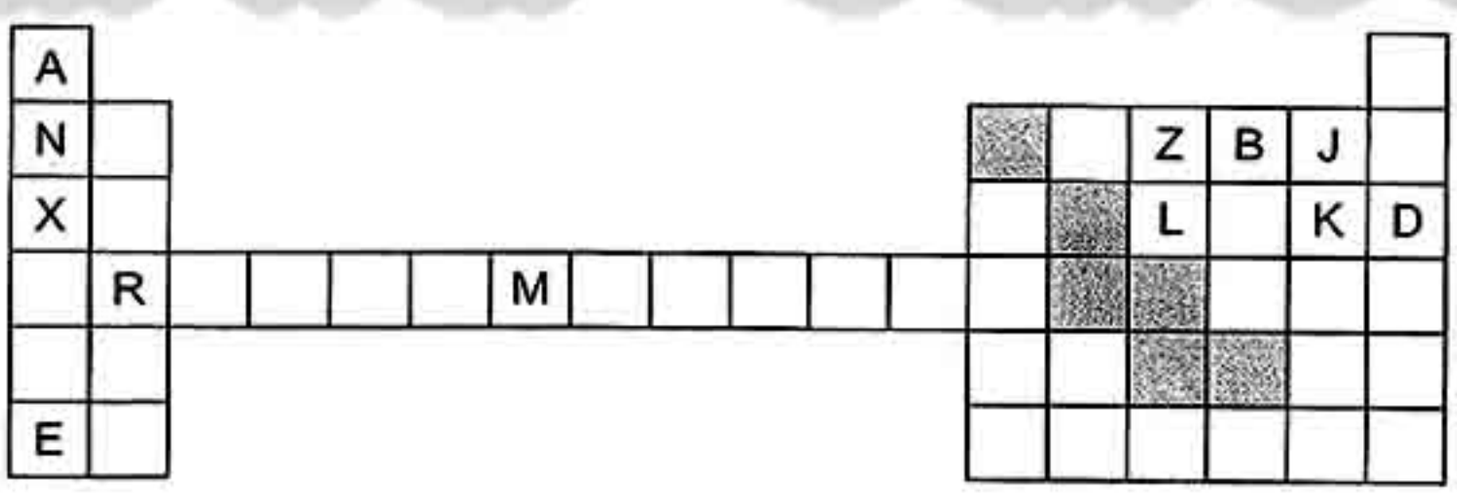
1. Dissolving of magnesium oxide in water.
2. Reaction of carbon dioxide with water.

Question 3

A Give reason for each of the following :

1. Oxygen gas evolves at the anode and hydrogen gas evolves at the cathode.
2. Occurrence of aurora phenomenon.
3. Sodium fires are not put off with water.
4. Water molecule is from polar compounds.

B Study the following figure which represents a section of a periodic table, then answer :



1. Mention the atomic number of element (B).
2. What do shaded area represent ?
3. Mention the symbol which represents :
   a. The most active element in group (1A).
   b. The element which has the largest atomic size in the second period.

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PART 2

Question 4

A Write the scientific term :

1. Tracess and remains of the old living organisms that are preserved in sedimentary rocks.
2. An instrument used by pilots to measure the elevation from the sea level.
3. They are safe areas established to protect endangered species in their homeland.
4. The weight of air column of atmospheric air on a unit area.
5. A charged layer reflects radio waves.
6. The most dangerous ozone pollutants known as freon.

B Choose from column (B) what suits it in column (A) :

(A)	(B)
1. The process of converting the part of living organism to petrified material. 2. The fossils which are in the rocks of different regions and indicate the extinction and evolution of organisms.	a. fossil record b. petrification c. protectorates

19 El-Sharkia Governorate — Directorate of Education

Answer the following questions :

Question 1

A Complete the following sentences :

1. Mendeleev arranged the elements ascendingly according to ....., while Moseley arranged them ascendingly according to .....
2. Elements of group (7A) are called .....
3. The modern periodic table consists of ..... horizontal periods and ..... vertical groups.
4. A bond that exists between water molecules is called .....
5. $Cl_2 + 2KBr \longrightarrow$ ..... + ...

B Locate the position of the following elements in the modern periodic table :

1. $_{19}K$ 2. $_{13}Al$ 3. $_{10}Ne$ 4. $_{12}Mg$

C Calculate the height of a mountain if the temperature at its base is 30°C and at its top is (–9°C).

Question 2

A Choose :

1. The volume of oxygen gas evolving from water electrolysis equals ..... the hydrogen volume.
   a. half b. double c. four times d. quarter

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2. All of the following gases are greenhouse gases except .....
   a. CO_2 b. O_2 c. N_2O d. CH_4
3. Complete body fossils of insects are found preserved in .....
   a. amber. b. snow. c. sedimentary rocks. d. ocean.
4. ..... causes blindness.
   a. Lead b. Mercury c. Sodium d. Arsenic

B Define :

1. Global warming phenomenon.
2. Chemical activity series.

C Mention one example for each of the following :

1. Extinct bird. 2. Most active metal.
3. Endangered bird.

Question 3

A Correct the underlined words :

1. Archaeopteryx represents the link between reptiles and **mammals**.
2. Meteors burn in **thermosphere** layer.
3. Ultraviolet radiation has a **thermal** effect.
4. **Dinosaur** is a mammal animal that has a shape midway between horse and zebra.

B Mention one use for each of the following :

1. Liquefied nitrogen. 2. Silicon. 3. Cobalt 60.

C Give reasons for :

1. Sodium is kept under the surface of kerosene.
2. The lower part of stratosphere is suitable for flying aeroplanes.

Question 4

A Write the scientific term :

1. A phenomenon that appears as brightly coloured light curtains seen from the both poles of the Earth.
2. Safe place that are specified to protect the endangered species in their homeland.
3. The weight of air column of an atmosphere height on a unit area ($1m^2$).
4. The ability of the atom in the covalent molecule to attract the electrons of the chemical bond towards itself.
5. The traces that indicate the remains of an old living organism after death.
6. Elements that have both properties of metals and nonmetals.

B Compare between :

Simple ecosystem and complicated ecosystem.

C Write the balanced chemical equation which expresses the reaction of :

1. Carbon dioxide with water.
2. Magnesium with dilute hydrochloric acid.

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PART 2

20 El-Gharbia Governorate — Central Science Supervision

Answer the following questions :

Question 1

A Complete the following statements :

1. Moseley arranged the elements ascendingly according to ..... , while Mendeleev arranged them ascendingly according to .....
2. Most of weather features occur in ..... layer, whereas satellites swim through the ..... layer.
3. Sodium is kept under the surface of ..... to prevent it from the reaction with ..... air.
4. Ultraviolet radiation has a ..... effect, and the infrared radiation has a ..... effect.
5. To obtain a complete body fossil of organism, it must be ..... fast as soon as it died in medium protects it from .....

B Give reason for each of the following :

1. Formation of ozone layer in stratosphere.
2. Naming the petrified forests with wood mountain.

C Locate the position of each element in the modern periodic table :

1. Calcium ($_{20}Ca$).
2. Sulphur ($_{16}S$).

Question 2

A Write the scientific term, which refers to each of the following statement :

1. The descending arrangement of elements according to their chemical activities.
2. A phenomenon that appears as brightly coloured light curtains at both the poles of the Earth.
3. Remains or traces of organisms that lived in the past were preserved in sedimentary rocks.
4. Continuous decrease in numbers of species without compensation until all die out.

B Write the balanced chemical equations representing the following :

1. The reaction between magnesium and dilute hydrochloric acid.
2. The reaction between bromine with potassium iodide.
3. The electrolysis of water.

C Calculate the height of a mountain if the temperature at its base is 30°C and at its top is (–9°C).

Question 3

A Choose the correct answer :

1. The scientist who discovered the main energy levels is .....

a. Moseley. b. Bohr. c. Hofmann. d. Mendeleev.

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2. The coldest atmospheric layer is .....
   a. troposphere. b. stratosphere. c. mesosphere. d. thermosphere.
3. Each period in the periodic table starts with a/an .....
   a. metal. b. metalloid. c. non-metal. d. inert gas.
4. Complete body fossils of insects are found preserved in .....
   a. ammonites. b. amber. c. igneous rocks. d. ambergris.
5. The snow crystal has ..... shape.
   a. octagonal b. quadrilateral c. pentagonal d. hexagonal

B What will happen when ... ?

1. Storing water in plastic bottles.
2. Increasing the ratio of greenhouse gases in the atmosphere.

C Mention one use of each of the following :

1. Liquefied nitrogen. 2. Aneroid.

Question 4

A Correct the underlined words :

1. Nonmetal oxides are considered **basic oxides**.
2. Ozone layer is measured in a unit called **picometer**.
3. The **nummulites** fossil is used for indicating the age of sedimentary rocks.
4. **Ibis bird** is from the birds that can't fly because of its small wings.

B Choose the odd word out, then mention what the rest has in common :

1. Lithium - Cesium - Sodium - Magnesium.
2. Methane gas - Carbon dioxide gas - Oxygen gas - Nitrous oxide.

C Arrange the following :

1. In a descending order according to electronegativity.
   ${}_{6}C$ - ${}_{9}F$ - ${}_{8}O$ - ${}_{7}N$
2. Fossils starting with first appearance on the life stage.
   Mold fossil of fish - Mammoth fossil - Trilobite fossil - Archaeopteryx.

21 Damietta Governorate — Damietta Educational Directorate

Answer the following questions :

Question 1

A Complete the following statements :

1. There are ..... bonds between water molecules, while the bonds between atoms in water molecules are ..... bonds.

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PART 2

2. The ultraviolet radiation has a ..... effect, and the infrared radiation has a ..... effect.
3. Elements of group (1A) are called ....., while elements of group (7A) are called .....
4. The highest temperature layer in the atmosphere is ..... and the least one is .....

B Mention one use for each of the following :

1. Altimeter. 2. Index fossil. 3. Liquefied nitrogen.

C Locate the position of the following elements in the modern periodic table :

1. $_{19}K$ 2. $_{10}Ne$

Question 2

A Write the scientific term for the following :

1. They are safe areas established to protect endangered species in their homeland.
2. Elements that have both properties of metals and nonmetals.
3. The halogen which exists in a liquid state.
4. Remains of old living organisms that preserved in sedimentary rocks.
5. The weight of air column of an atmosphere height above a unit area.

B Compare between each of the following (one point only for each) :

1. Simple ecosystem and complicated ecosystem.
2. Near ultraviolet rays and far ultraviolet rays.

C Mention the harms of :

Storing tap water in plastic bottles.

Question 3

A Choose the correct answer :

1. Carbon dioxide dissolves in water forming .....
   a. base. b. acid. c. neutral. d. halogen.
2. All of the following are endangered species except .....
   a. panda bear. b. bald eagle. c. quagga. d. rhinoceros.
3. ..... react very slowly with cold water.
   a. K and Na b. Ca and Mg c. Zn and Fe d. Cu and Ag
4. Meteors are formed and burned in ..... layer.
   a. troposphere b. stratosphere c. mesosphere d. thermosphere
5. ..... is an example of complete body fossils.
   a. Mammoth b. Ferns c. Coral d. Foraminifera

B Write the balanced chemical equations which express the following reactions :

1. Sodium with water. 2. Dissolving of magnesium oxide in water.
3. Bromine with potassium iodide.

C Mention the measuring unit of :

1. The degree of ozone layer. 2. The atomic size of element.

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Question 4

A Give reasons for :

1. Silicon slides are used in manufacturing of computers.
2. Elements of the same group have similar properties.
3. Water has high boiling point.

B What is meant by ... ?

1. Van-Allen belts.
2. Chemical activity series.
3. Petrification.

C Correct the underlined words :

1. **Ozone** is the curved lines that join the points of equal pressure in atmospheric pressure maps.
2. **Quagga** is the most famous extinct animal in the old times.
3. Water has **alkaline** effect on litmus solution.

22 Kafr El-Sheikh Governorate — Science Director - General

Answer the following questions :

Question 1

A Complete the following statements :

1. The modern periodic table consists of ..... horizontal periods and ..... vertical groups.
2. Most of weather features occur in ..... layer, while satellites rotate in ..... layer.
3. Archaeopteryx represents the link between ..... and .....
4. $Cl_2 + 2KBr \longrightarrow$ ..... + ...

B Explain the behaviour of the following elements with water :

1. Iron.
2. Potassium.

Question 2

A Choose the correct answer :

1. Which of the following fossils plays an important role in petroleum exploration ? .....
   a. Foraminifera and radiolaria. b. Nummulites. c. Foraminifera and trilobite.
2. The ..... is/are used in preservation of agricultural crops.
   a. methyl bromide gas b. halons c. nitrogen oxide
3. The hottest atmospheric layer is .....
   a. troposphere. b. mesosphere. c. thermosphere.
4. The elements of group (7A) are known as .....
   a. alkali metals. b. halogens. c. alkaline Earth metals.
5. There are ..... bonds among water molecules.
   a. ionic b. hydrogen c. covalent

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PART 2

6. Nonmetal oxides are ..... oxides.
   a. acidic b. basic c. amphoteric
7. All of the following are greenhouse gases except .....
   a. CH_4 b. N_2O c. O_2

(B) Give reasons for :

1. The atmospheric pressure decreases as we go up.
2. Sodium fires do not put off with water.

Question 3

(A) Write the scientific term :

1. The vertical columns in modern periodic table.
2. Traces and remains of living organisms that are preserved in sedimentary rocks.
3. Decrease in thickness of ozone layer.
4. The two magnetic belts that help in dispersing the harmful charged cosmic radiations.
5. The gas which is collected at the anode in water electrolysis.
6. The radioactive element which is used in food preservation.

(B) Locate the position of the following elements in the modern periodic table :

1. $[_{19}K]$ 2. $[_{9}F]$ 3. $[_{5}B]$ 4. $[_{10}Ne]$

Question 4

(A) Put (✓) or (✗) in front of each of the following :

1. The air moves horizontally in the lower part of the stratosphere. ( )
2. Ice crystals have pentagonal shapes. ( )
3. In the period, as the atomic number increases the metallic property increases. ( )
4. The fossil record indicates the age of the sedimentary rocks. ( )
5. The ozone degree is measured in a unit called Dobson. ( )

(B) Calculate the height of a mountain if the temperature at its base is [30°C] and at its top is [–9°C].

23 El-Behira Governorate

Kafr El-Dawar Educational Zone
El-Safwa Private Schools

Answer the following questions :

Question 1

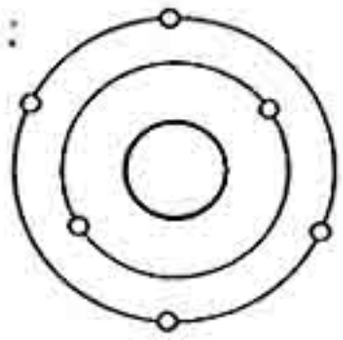
(A) Complete the following :

1. Ozone layer lies in ..... layer.
2. Nummulites fossil is an example of ..... fossils but amber fossil is an example of ..... fossils.
3. There are ..... bonds between molecules of water.

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4. ..... and ..... are examples of some extinct species in the old times.
5. ..... is an instrument used to determine the possible day weather.
6. ..... is considered form safe places that has endangered species.

B Mention the atomic number of the element that follows that element in :



1. The same period.
2. The same group.

Question 2

A Choose the correct answer :

1. The scientist who left gaps in his table to be filled with suitable discovered elements in future is .....
   a. Moseley. b. Rutherford. c. Bohr. d. Mendeleev.
2. ..... is the hottest atmospheric layer.
   a. Stratosphere b. Mesosphere c. Thermosphere d. Troposphere
3. The snow crystal has ..... shape.
   a. octagonal b. quadrilateral c. pentagonal d. hexagonal
4. ..... is an example of endangered living organisms.
   a. Bald eagle b. Passenger pigeon c. Tasmanian cat d. Dinosaur

B Mention the diseases which are causes by :

1. Mixing animals and human wastes with water.
2. Drinking water contains high concentration of mercury.

C Give one example for :

1. An element reacts instantly with water.
2. A plant is endangered.
3. An element is used in preservation of cornea of eye.

Question 3

A Write the scientific term :

1. Elements which have properties of metals and nonmetals.
2. A group contains the strongest nonmetal.
3. It is a region in which the atmosphere envelope is inserted in outer space.
4. A bird is characterized by small wings and short legs.
5. They are traces and remains of old living organisms that are preserved in sedimentary rocks.
6. An atmospheric layer in which air currents move vertically.

B Give reasons for :

1. The lower part of stratosphere is suitable for flying airplanes.
2. Petrified wood are considered fossils although they look like rocks.

C Write the chemical equations represent each of the following :

1. Dissolving of magnesium oxide in water.
2. Reaction of chlorine with potassium bromide.

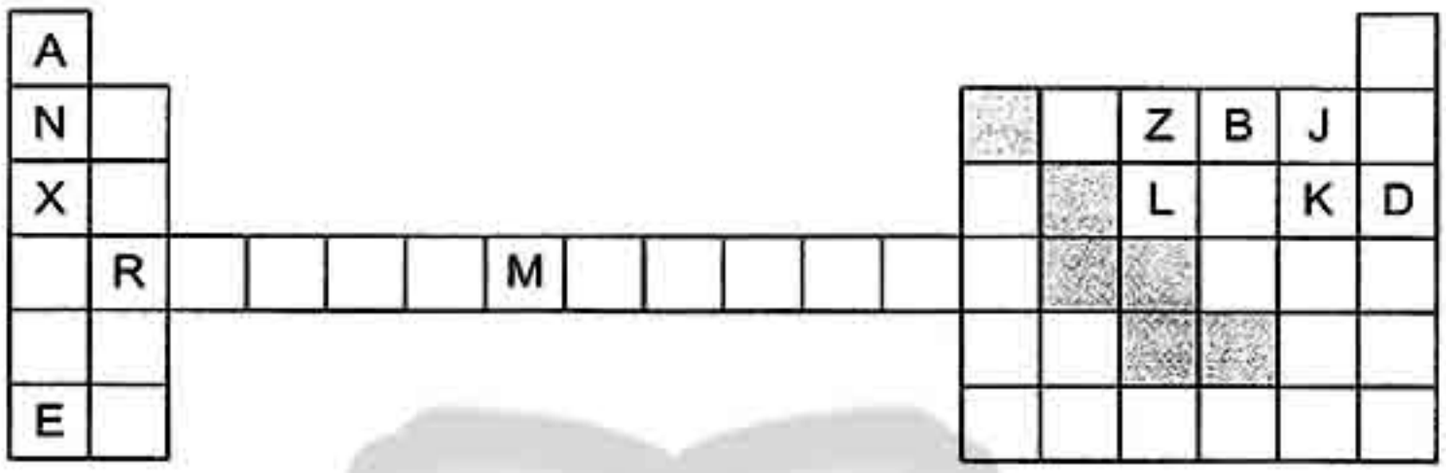
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PART 2

Question 4

A Look at the following diagram which represents a part of the modern periodic table, then answer :



Write the letter (s) which represent (s) :

1. Transition element.
2. The strongest metal.
3. The strongest nonmetal.
4. Noble gas.

B Define :

1. Chemical activity series.
2. Extinction.
3. Electronegativity.
4. Atmospheric pressure.

C Calculate the height of a mountain if the temperature at its base is 20°C and at its top is (–6°C).

24 Ismailia Governorate — Directorate of Education

Answer the following questions :

Question 1

A Complete the following :

1. Mendeleev arranged the elements ascendingly according to ....., while Moseley arranged them ascendingly according to .....
2. The highest temperature atmospheric layer is ..... and the least temperature one is .....
3. $Mg + 2HCl \longrightarrow$ ..... + ...
4. Among the pollutants of the ozone layer are ..... compounds that are used in air conditioning sets and ..... compounds that are used in extinguishing fires.

B $C + O_2 \xrightarrow{\Delta} (A)$

$(A) + H_2O \longrightarrow (B)$

1. Write the chemical formula of (A) and (B).
2. Mention the effect of (B) on a litmus paper.

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Question 2

A Compare between (in a table) :

1. Simple ecosystem and complicated ecosystem.
   (according to : Number of members - Example)
2. Troposphere and stratosphere layers.
   (according to : Height - Temperature at its top)

B What is meant by ... ?

1. Fossils.
2. Chemical activity series.
3. Electronegativity.

C Study the opposite figure, then answer :

A
$_{11}$B
C
D

1. Locate the position of element (B) in the modern periodic table.
2. The figure represents group ..... which are named as .....
3. What is the periodic number of the elements (C) and (D) ?

Question 3

A What happens when ... ?

1. Melting of the snow of the two poles.
2. Overuse of methyl bromide.
3. Drinking water with high concentration of mercury.

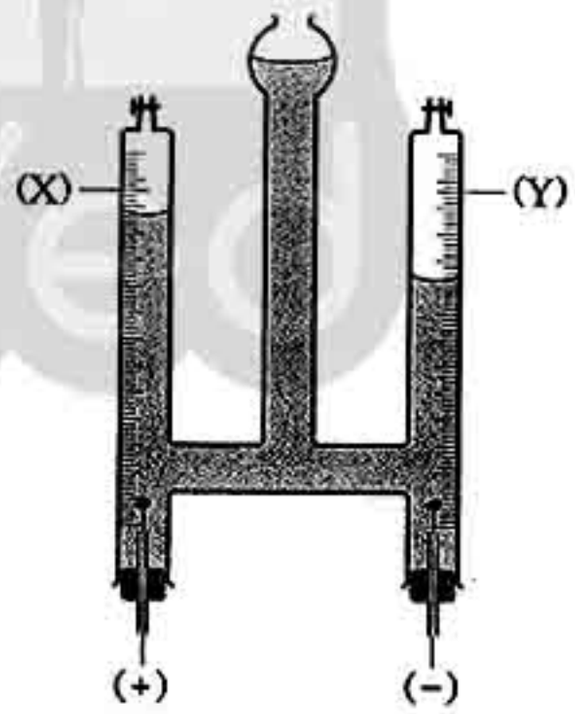
B Write the scientific term :

1. Safe areas established to protect endangered species in their homeland.
2. Two magnetic belts help in scattering the harmful radiation away from the Earth.
3. A solid halogen.

C Mention the importance of the following :

1. Liquefied nitrogen.
2. Cobalt 60.
3. Altimeter.
4. Coral fossil.

D From the opposite figure, answer the following :



1. What's the name of this apparatus ?
2. Letter (X) on the figure represents .....
3. Letter (Y) on the figure represents .....
4. Write the symbolic balanced chemical equation.

Question 4

A Choose :

1. ..... fossils are found in limestone rocks of El-Mokattam mountain.
   a. Ferns b. Radiolaria c. Nummulites d. Fish
2. All of the following are from semi-metals except .....
   a. tellurium. b. silicon. c. boron. d. bromine.
3. The scientist ..... discovered the main energy levels of the atom.
   a. Bohr b. Mendeleev c. Newton d. Moseley
4. All of the following are from greenhouse gases except .....
   a. nitrogen oxide. b. CO_2 c. water vapour. d. nitrous oxide.

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PART 2

Ⓑ Give reasons for :

1. Water has high boiling point.
2. Sodium and potassium are kept under kerosene surface.
3. Ionosphere layer is important for radio stations.

Ⓒ Calculate the temperature at the top of a mountain which its height is 5000 meters, if the temperature at the base of that mountain is 28°C.

25 Port-Said Governorate

Educational Directorate
Science Inspectorate for Language Schools

Answer the following questions :

Question 1

Ⓐ Complete the following statements :

1. The modern periodic table consists of ..... horizontal periods.
2. Archaeopteryx represents the link between ..... and .....
3. Ultraviolet radiation has a ..... effect.

Ⓑ Give reasons for the following :

1. Water molecule is a polar molecule.
2. The occurrence of the aurora phenomenon.
3. Although sugar is a covalent compound, it dissolves in water.

Question 2

Ⓐ Write the scientific term for each of the following statements :

1. A group contains the strongest nonmetals.
2. The environmental system that is affected severely by the absence of one species of living organisms that live in it.
3. The vertical columns in Mendeleev's table.

Ⓑ Calculate the height of a mountain if the temperature at its base is 30°C and at its top is –6°C.

Ⓒ Mention one difference between each of the following :

1. Simple and complicated ecosystems.
2. Natural and industrial water pollutants.

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Question 3

A Choose from column (B) what suits it in column (A) :

(A)	(B)
1. Altimeter	a. The layer that has all the weather phenomena.
2. Thermosphere	b. A suitable layer for airplanes flying.
3. Troposphere	c. A device used to measure the altitude of planes.
4. Stratosphere	d. The hottest layer in the atmospheric envelope.

B What happens in the following situations ... ?

- Putting a magnesium strip inside a test tube containing oxygen.

C Correct the underlined words :

1. **The passenger pigeon** is from the birds that can't fly because of its small wings.
2. Each period ends with a **nonmetal**.
3. **The environmental systems** are safe places which are specified to protect the endangered species in their natural environments.

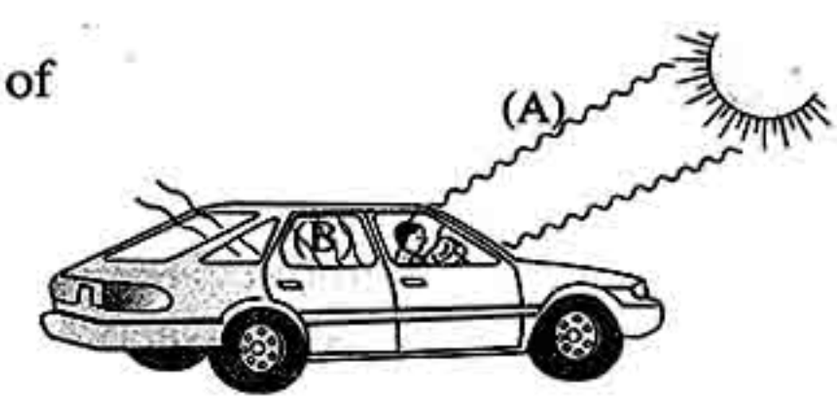
Question 4

A Choose the correct answer :

1. ..... is an example of microfossils.
   a. Mammoth b. Ferns c. Foraminifera d. Archaeopteryx
2. The scientist ..... discovered the main energy levels in the atom.
   a. Bohr b. Mendeleev c. Moseley d. Hofmann
3. All of the following are endangered species except .....
   a. panda bear. b. bald eagle. c. quagga. d. rhinoceros.
4. Sodium oxide is from ..... oxides.
   a. amphoteric b. acidic c. nonmetallic d. basic

B The opposite figure shows a person in a car with closed windows :

1. Label the letters (A) & (B) that represent two types of electromagnetic waves.
2. What is the process expressed by this figure ?



C Define each of the following :

1. Chemical activity series.
2. Fossils.
3. Water pollution.

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PART 2

26 Suez Governorate — Directorate of Education and Teaching Inspect of Science

Answer the following questions :

Question 1

A Complete the following statements :

1. The scientist ..... discovered the main energy levels in the atom.
2. Among the pollutants of the ozone layer are ..... compound that is used in air conditioning set.
3. Ultraviolet radiation has a ..... effect and the infrared radiation has a ..... effect.
4. Archaeopteryx represents the link between ..... and .....

B What are the results of ...?

1. Presence Van-Allen's belts.
2. Storing water in plastic bottles.

C Write the scientific term :

1. Metals are arranged descendingly according to their chemical activity.
2. The ability of the atom in the covalent molecule to attract the chemical bond electron to it.
3. The region where the atmospheric envelope merges with the outer space.
4. They are the remains or traces of organisms that lived in the past and were preserved in sedimentary rocks.

Question 2

A Give reasons for :

1. Alkali metals are kept under kerosene in the lab.
2. The lower part of the stratosphere is suitable for airplanes flying.
3. Presence of hydrogen bond between water molecules.
4. Ionosphere is important for radio stations.

B Choose :

1. When sodium reacts with water, ... gas evolves.
   a. O_2 b. CO_2 c. H_2 d. N_2
2. Ozone layer is measured in a unit called .....
   a. km. b. Dobson. c. nm. d. mm^3.
3. Complete fossils of insects are found preserved in .....
   a. ammonites. b. amber. c. igneous rocks. d. ambergris.
4. All of the following are endangered species except .....
   a. panda bear. b. bald eagle. c. quagga. d. rhinoceros.

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C Study the opposite figure, then answer :

What is the symbol (s) which indicate (s) the :

1. Inert gases.
2. Alkali metals.
3. Halogens.

																	N
A													I	K		L	
	C											H					O
B				D			E		F		G		J			M	

Question 3

A What happens when ... ?

- Adding the purple Sunflower solution to a jar has a piece of burning coal. [Write the symbolic balanced equation].

B Correct the underlined words :

1. The elements in **Mendeleev's** table are arranged according to the increase of atomic numbers.
2. **The radioactive cobalt** is used in preservation of cornea of the eye.
3. Element which its atomic number is **12** lies in period four and group (2A).
4. **Fluroine gas** is used as an insecticide to preserve stored agricultural crops.
5. **Nobel gases** are elements which have both properties of metals and nonmetals.

C During the electrolysis of acidified water, the volume of the gas which increases the glowing of burning fragment when approaching is equal to 7 cm^3 :

1. What is the name of this apparatus in the process of electrolysis ?
2. What is the gas name ? and it evolves at ..... pole.
3. Write the balanced symbolic equation of this reaction.

Question 4

A Write the symbolic balanced chemical equations that indicate the following reactions :

1. Magnesium with hydrochloric acid.
2. Chlorine gas with potassium bromide solution.

B What do you expect when ... ?

1. Absence of one of its species from the simple ecosystem.
2. Establishing natural protectorate.

C If the temperature at the base of Mountain Everest is 20°C. How much is the temperature at its top if the mountain height is 8 km.

D What is meant by ... ?

1. Extinction.
2. Global warming phenomenon.

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PART 2

27 Beni-Sueif Governorate — Official Language Schools Directorate

Answer the following questions :

Question 1

A Complete the following statements :

1. Mendeleev arranged the elements ascendingly according to ....., while Moseley arranged them ascendingly according to .....
2. Sodium is kept under the surface of ..... to prevent it from the reaction with .....
3. Troposphere contains about ..... % from atmospheric envelope mass and about ..... % from atmospheric water vapour.
4. When the density of greenhouse gases increases in the Earth's atmospheric envelope, it allows the passage of ..... and .....
5. Fossils are traces and remains of ..... organisms that are preserved in ..... rocks.
6. From the extinct animals in the old ages are ..... and .....

B Calculate the height of a mountain if the temperature at its base is 30°C and at its top is (–9°C).

Question 2

A Give reason for each of the following :

1. Mendeleev left gaps (empty places) in his periodic table.
2. Importance of fossils in petroleum exploration.
3. Increasing the size of ozone hole in September every year.

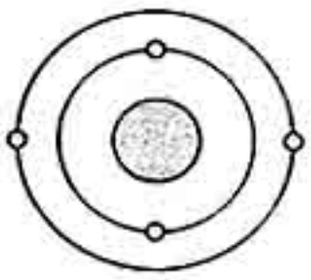
B Locate the position of these elements in the modern periodic table :

1. $^{20}_{10}Ne$ 2. $^{40}_{20}Ca$

C Study the opposite figure that shows the electronic configuration of element (x) in the modern periodic table :

- Deduce the atomic number of the element that follows that element in :

1. The same period. 2. The same group.



Question 3

A Choose the correct answer :

1. The number of known elements in the modern periodic table till now is .....
   a. 217 b. 316 c. 16 d. 118
2. The 3rd period starts with elements their oxides as the following .....
   a. basic, amphoteric, then acidic. b. acidic, basic, then amphoteric.
   c. acidic, amphoteric, then basic. d. basic, acidic, then amphoteric.

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3. ..... in its salt solutions.
   a. Chlorine replaces bromine
   b. Bromine replaces fluorine
   c. Iodine replaces chlorine
   d. Iodine replaces fluorine

4. After solidification of the resinous matter secreted by pine trees in the old geological periods, it forms .....
   a. amber fossil.
   b. fossil of a complete body.
   c. trilobite fossil.
   d. nummulites fossil.

5. ..... is the second layer of atmospheric envelope.
   a. Troposphere
   b. Stratosphere
   c. Mesosphere
   d. Thermosphere

6. ..... is used as an insecticide to preserve stored agricultural crops.
   a. Methyl bromide gas
   b. Halons
   c. Nitrogen oxide
   d. Freon

7. Worm's tunnels fossil is formed because of .....
   a. the presence of hard skeleton.
   b. the activity of worms during its life.
   c. the death of the worms themselves and quickly buried in sedimentary rocks.

8. ..... protectorate is the first established natural protectorate in Egypt.
   a. Saint Cathrine b. Ras Mohamed c. Wadi Hetan d. Petrified forest

B Mention one use of each of the following elements :

1. Cobalt 60.
2. Liquefied nitrogen.

Question 4

A Write the scientific term :

1. The block that contains the series of lanthanides and actinides.
2. A charged layer reflects radio waves.
3. Thinning or losing parts of ozone layer above the south pole.
4. Fossils of organisms that had lived for a short period of time in the past and had a wide geographic distribution.

B Mention one difference between each of the following :

1. Complicated ecosystem and simple ecosystem.
2. The benefits (or characteristics) of Ras Mohamed protectorate and Wadi Hetan region.

C Write the balanced chemical equation which expresses the following reaction :

Carbon dioxide with water.

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PART 2

28 El-Minia Governorate — Administration of Distinguished and Governmental Language Schools

Answer the following questions :

Question 1

A Complete the following statements :

1. Fossils are found in ..... rocks.
2. ..... is the region between stratosphere and mesosphere.
3. Metal oxides are called ..... oxides, while nonmetal oxides are called ..... oxides.
4. Ultraviolet radiations have ..... effect, while the infrared radiations have ..... effect.
5. The scientist ..... discovered the main energy levels in the atom, but the scientist Rutherford discovered .....

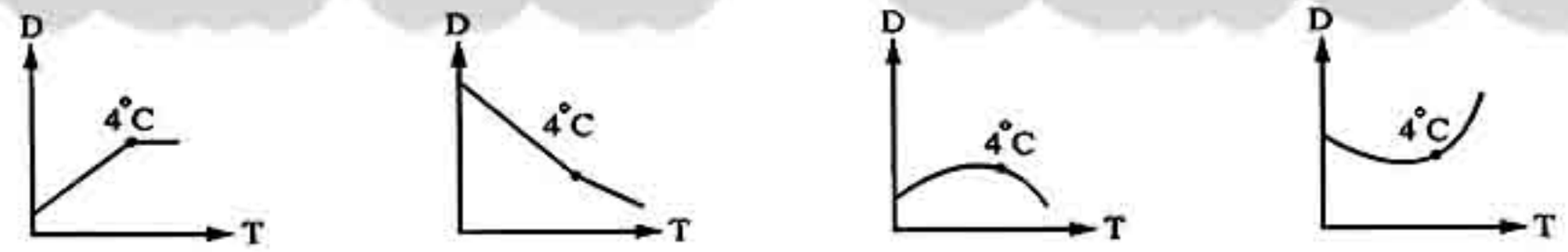
B Write the balanced chemical equations :

1. The formation of ozone gas.
2. Reaction between chlorine gas and potassium bromide.

Question 2

A Choose the correct answer :

1. The element which locates in period (3) and group (3A) is .....
   a. $_{13}Al$ b. $_{5}B$ c. $_{11}Na$ d. $_{15}P$
2. All of the following gases are greenhouse gases except .....
   a. CO_2 b. N_2O c. O_2 d. CH_4
3. The figure ..... represents the change of water density by changing the temperature.



a. b. c. d.

4. The air moves ..... in the stratosphere layer.
   a. horizontally b. vertically c. inclined d. no correct answer
5. Complete body fossils of insects are found preserved in .....
   a. ammonites. b. amber. c. igneous rocks. d. scorpion.

B Give reasons for :

1. Water molecules are from polar compounds.
2. The atomic size increases through group.

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Question 3

A Write the scientific term for each of the following statements :

1. Curved lines that join the points of equal pressure in the atmospheric pressure maps.
2. The halogen which exists in a solid state.
3. Thinning or losing parts of ozone layer.
4. Elements that have properties of metals and nonmetals.
5. A type of ultraviolet radiations that is absorbed completely 100 % in ozone layer.
6. Arrangement of metals in a descending order according to their chemical activity.

B Problem :

If the temperature at the top of a mountain is 17°C.
Calculate the temperature at its base if the mountain height is 2000 m.

Question 4

A Correct the underlined words :

1. **50%** of the mass of the atmospheric envelope is present in the area between the sea level and 13 km elevation.
2. **Cobalt 60** is used in preservation of cornea of the eye.
3. Elements of "p" block are organized in **5 groups**.
4. **Chemical pollution** of water causes typhoid and hepatitis.
5. Extinction of some polar animals is from the **positive effects** of global warming phenomenon.

B What happens when adding HCl to the following elements ... ?

1. Copper.
   (Write the chemical equation).
2. Magnesium.

29 Assiut Governorate — Administration of Distinguished and Governmental Language Schools

Answer the following questions :

Question 1

A Complete the following statements :

1. Drinking water has high ratio of ..... which causes the death of brain cells.
2. The atmospheric layer containing most of the water vapour is .....
3. The number of electrons in the outermost energy level indicates ..... number.
4. There are ..... bonds between water molecules, while the bonds between atoms in water molecules are ..... bonds.

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الصف الثانى الاعدادى موقع ذاكرولى التعليمى كتاب المعاصر

PART 2

B Write the measuring unit of :

1. The wavelength of ultraviolet rays.
2. Atmospheric pressure.

C Locate the position of the following elements in the modern periodic table :

1. $_{13}Al$ 2. $_{10}Ne$

Question 2

A Choose the correct answer :

1. The element which its atomic number equals 17 is similar to that of atomic number equals .....
   a. 7 b. 19 c. 9 d. no correct answer.
2. Elements in d-block are called .....
   a. alkaline Earth metals. b. halogens.
   c. transition elements. d. alkali metals.
3. The coldest layer in the atmosphere is .....
   a. mesosphere. b. stratosphere.
   c. ionosphere. d. thermosphere.
4. Complete body fossils of insects are found preserved in .....
   a. amber. b. ambergris.
   c. igneous rocks. d. no correct answer.

B State using equations :

- How to obtain H_2 by using three different methods.

C Mention the importance of :

1. Van-Allen belts. 2. Cobalt 60

Question 3

A Correct the underlined words :

1. Elements of group (1A) are known as **inert gases**.
2. Each period ends with a **nonmetal**.
3. Archaeopteryx links between reptiles and **mammals**.
4. The **halons** are produced from burning supersonic airplanes.

B Compare between :

1. Fluorine and cesium [according to chemical activity].
2. Near ultraviolet rays and far ultraviolet rays [according to wavelength].

C Write the balanced chemical equations which express the reaction of :

1. Carbon dioxide with water. 2. Halogen with metallic element.

هذا العمل خاص بموقع ذاكرولى التعليمى ولا يسمح بتداوله على مواقع أخرى
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Question 4

A Write the scientific term :

1. The apparatus which is used for electrolysis of water.
2. The scientist who discovered the presence of protons in the nucleus of the atom.
3. The series in which metals are arranged in a descending order according to their chemical activity.
4. Non-flying bird which became extinct.

B Give reasons for :

1. Mendeleev left empty places in his table.
2. Ionospherer layer is important for wireless communications.

C Calculate the temperature at the top of a mountain with a height 8000 m if the temperature at Earth's surface equals 22°C.

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Answer the following questions :

Question 1

A Complete the following statements :

1. Ultraviolet radiation has ..... effect, while infrared radiation has ..... effect.
2. The highest temperature layer in the atmosphere is ..... and the least temperature is .....
3. Archaeopteryx fossil links between ..... and .....
4. Desert is an example of ..... ecosystem, while tropical forest is an example of ..... ecosystem.

B Give one use for :

1. Aneroid.
2. Liquid sodium.
3. Index fossils.

C Calculate the height of a mountain if the temperature at its base is 30°C and at its top is (–9°C).

Question 2

A Give reasons of the following :

1. Increase CO_2 gas ratio in the atmosphere.
2. Water molecule is from polar molecules.
3. Elements of group (1A) are known alkali metals.
4. The lower part of the stratosphere is suitable for flying airplanes.

B Locate the position of the following elements in the modern periodic table :

1. $_{20}Ca$
2. $_{3}Li$
3. $_{8}O$

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PART 2

C Write one example for :

1. A complete body fossil.
2. A metal reacts very slowly with cold water.
3. An animal extinct in old times.

Question 3

A Choose the correct answer :

1. All of the following are greenhouse gases except .....
   a. CO_2 b. N_2O c. O_2 d. CH_4
2. The atmospheric pressure on the top of a mountain is ..... the atmospheric pressure at sea level.
   a. more than b. less than
   c. equal to d. no correct answer
3. In the periodic table, the elements which are identical in properties lie in the same .....
   a. period. b. group.
   c. nucleus. d. no correct answer.
4. ..... is used in food preservation.
   a. Cobalt 60 b. Silicon
   c. Liquefied nitrogen d. No correct answer

B Write the chemical equation for each of the following :

1. Reaction of sodium with water.
2. Reaction of magnesium with hydrochloric acid.

C Correct the underlined words :

1. Pure water in normal atmospheric pressure boils at **70°C**.
2. Petrified wood is considered from **rocks**.
3. The physical state of iodine is **liquid** state.

Question 4

A Write the scientific term :

1. The apparatus which is used in water electrolysis.
2. Weight of air column of atmosphere height on a unit area.
3. It is a phenomenon that appears as brightly coloured curtains seen from both poles.
4. A descending arrangement of elements according to their chemical activity.

B Compare between :

1. Mendeleev's periodic table and Moseley's periodic table [according to the arrangement of the elements].
2. Acidic oxides and basic oxides [according to dissolving in water].

C Find the atomic number for the following elements :

1. Element X lies in third period and group (6A).
2. Element Y lies in the fourth period and group (2A).

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